ELECTRICAL REVIEW

[ILLUSTRATED.]

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For News At Home Seek Abroad.

The frontispiece is from *La Lumiere Electrique*. We hasten to beg our readers to calm any trepidation which may naturally arise. It is simply a playful recreation in which our facetious contemporary is indulging. The French character, as we all know, is full of mirth and sparkle, and is liable to overflow when the cork is out.

In this instance the cork has got out, and our usually correct co-laborer in the electrical fields and pastures has perpetrated a huge joke!

The engraving is excellent, and the matter truthful—with one or two minor exceptions. New York was evidently out of town on the day on which this view was taken, or else Barnum's circus had arrived with Jumbo, in the upper districts. There is, withal, an air of loneliness about this picture which is not entirely in keeping with the vein in which, we are sure, it is the intention to treat the subject, and we would venture to suggest a larger crop of things that move and have their being and —— a few more wires might be added to give tone to the whole.

We quote: "Here (in Paris) it would be difficult to find a wire traversing the street, whereas, the first thing that strikes the newly disembarked voyager in New York is the immense number of telegraph and telephone wires." Right here we may as well offer a theory. This statement coming from such excellent authority, has furnished the missing link, as it were. It has long been a matter of legendary record that at certain hours and under certain extraordinary conditions, observers have counted two or more moons in the sky at the same instant of time. Might it not, we suggest, and do not desire to take too much credit for the suggestion, might it not be possible to apply this phenomenon to the case of electric wires?

This would certainly seem a matter worthy the attention of the devotees of the science of psychology, and if further corroborative evidence should be desired, our legislators at Albany for the past two years might give inestimable aid in the research.

—— Oppermann Bros., electric light engineers, of England, with a house in London and one in Chicago, have become bankrupt. The liabilities and assets of the firm are not stated.

What is the Best Way to Provide a Telephone Office with a Complete Set of Testing Apparatus?

Editors of Electrical Review:

In reply to the question of your correspondent, "What is the best way to provide a telephone office with a complete set of testing apparatus?" I would say that I can only point out a few general principles. Each exchange differs so greatly from all others in the arrangement of rooms and switch, etc., each superintendent or inspector must arrange and apply the apparatus himself. If good, thorough work is to be done, a room separate from the interruptions of the operating room should be provided, but it should be in close proximity to the switchboard for convenience. Means should be provided by which any line coming into the exchange can easily be reached, if possible, without too great cost; the line should be taken at a point beyond or outside of the annunciator. It is not always necessary to run all the lines into this test-room, but simply arrange connections at the switchboard, so that three or four lines may be connected at a time into the test-room.

A good "Wheatstone bridge" set is the best for all purposes.

The rheostat should be capable of measuring from a small fraction of an ohm to several megohms. The two branches of the bridge should have three or four sets of resistance coils; 10, 100, 1,000, are convenient sizes. Even a 10,000 coil can be added if insulation of cables, etc., is to enter into the measurements (and, of course, it should).

The coils of the rheostat can be from 1 ohm to 4,000 ohms, more or less. The galvanometer, too, should be of an approved pattern. It is desirable to have two different galvanometers—one for ordinary measurements of conductors, which need not be so sensitive as that for measuring insulation. If but one galvanometer is used, two coils of, say, 20 ohms and 100 or 200 ohms, should be provided for insulation measurements; a coil of 300 ohms is still better.

A battery that can be varied from two jars to fifty is also desirable. Of course, the larger number of cells is used when measuring great resistances.

The instruments should be placed as remote as possible from magneto bells or other electro-magnets, to prevent errors arising from their influence.

Measurements should be made of everything from annunciator to ground, and record kept in proper book.

The simplest measurements are for crossed lines. A "solid cross" can be located within a few hundred feet, or less, from this the inspector or electrician can branch out to insulation tests, etc.

It will be convenient to arrange a book, taking a page for a line; measure the line in sections, and note the resistance from office to each section, with a memorandum of size of wire or cable conductor, etc.; then, when double comes, it can be located.

I. H. FARNHAM,
Electrician.

BOSTON, Oct. 8, 1885.

PARISIAN SKETCH OF OVERHEAD WIRES IN VICINITY OF WESTERN UNION BUILDING, NEW YORK CITY.

*** The daily press is entertaining its readers with full and exhaustive treatises on matters telephonic. The action of the Department of Justice in authorizing the suit to be brought against the American Bell Telephone Company, has caused this state of things.

Tones and Vibrations.

SECOND ARTICLE.

By C. C. Haskins.

One of the simplest illustrations of the results of vibrations is seen in the phonograph. In this the vibratory action is produced by muscular movement, resulting in vocal utterances. The vibrations are communicated to the air; these are, in turn, impressed upon a diaphragm, on the lower surface of which a needle-point barely rests on thin tinfoil enveloping a revolving cylinder. On this cylinder a groove is cut, running from end to end, like that in a fine screw. The point being constantly above this groove, any depression of the point by vibratory impulses will, of course, be reproduced on the yielding surface of tin. When the foil has been thus marked, and is again drawn beneath the point in the same direction as before, the sounds are repeated mechanically through the action of the recorded vibrations which it has received. What appears upon the tinfoil as merely a succession of slight indentations, if placed beneath a microscope, proves to be a succession of dots, more or less deeply indented, according to the force of the vocal impulses, and finer or coarser proportioned to the pitch—the higher tones producing a greater number in the same space, while the deeper tones are fewer in number. Having once recorded a sentence in this manner, a second may be impressed in the same line, and the effect, when reproduced as above, will be a more or less perfect repetition of both sentences at the same time. Musical tones are much more perfectly recorded and reproduced by the phonograph than simple vocal utterances, and very curious musical harmony has been sometimes quite faithfully rendered by this curious scientific toy. Previous to the phonograph, records of vibrations had been made by the use of plates of glass, covered with a light coating of lampblack, upon the face of which a vibrating point removed the smoked surface; and these tracings, submitted to a simple magnifying glass or microscope, showed the track of the point, and the many variations of both rate and amplitude of the movements.

The late Professor Jenkins, of Louisville, Ky., once related to the writer a conversation of years ago, when the science of vibrations was but little understood, between the professor and Prentiss, of the Louisville *Journal*, which will illustrate the skepticism with which a new fact in science is usually met. He related to the editor how he could make a visible record of the vibrations of the voice. Prentiss looked him steadily in the eye for a moment, and said, in a low, deprecatory tone, "For God's sake, Jenkins, keep it to yourself, or they will have you in the lunatic asylum in 24 hours." This sort of removal of advanced scientific investigators from communities is not by any means rare. Fulton, Franklin, he who first proposed the use of iron columns for buildings, are among those who by popular verdict were crazy and dangerous in their doctrines, as well as historical individuals of former ages.

There are several methods by which the rate of a given vibration may be enumerated. Any method by which a given tone is produced mechanically may, by proper appliances, be so counted. A curious fact in the rate of movement—the musical name of a certain number of vibrations—is worthy of note. The tone of the second violin string, A, open, for instance, has undergone a constant upward rise, until, from being 405 to the second, in the year 1700, it had arrived at from 448 to 455 in different localities, so that a wide difference of pitch exists to-day among the different musical standards. The explanation of this gradual upward tendency is found in the changing fundamental tone of a tuning fork, affected by temperature.

The manufacturers of these attune them by filing or grinding. More or less heat is developed by this process, and when the instrument is finished there is still a trifle of heat left in the steel. On cooling, the tone rises an infinitesimal quantity—so small as to be hardly appreciable. Yet it will readily be seen if from this fork a second is tuned, and from the second a third, and so on indefinitely, a very appreciable rise in tone will eventually result. It has taken a long series of years to do this, but the explanation above given is probably the true one.

The vibrations due to heat have been prettily utilized by Somzee in an instrument for warning laborers of the presence of explosive gases in coal mines. A flame within a cylindrical glass chimney burns noiselessly in a chamber where the atmosphere is comparatively pure and wholesome. Now, when the air becomes tainted by an admixture of the dangerous gas, the flame becomes larger, and the glass chimney is set into rapid vibration, producing a musical tone, which is heard and heeded as a warning of the threatened danger.

Similarity to the mixture of sounds in the phonograph, which is mentioned above, is seen in the mixture of light vibrations in colors. It is readily demonstrated that in analyzing a ray of light by means of a prism, the different hues obtained have each their different rates of vibration Two or more of these may be commingled to produce a new color—something as two or more musical tones form a combination of blended sounds producing a resultant, agreeable or otherwise, according to the proportions of the vibratory rates of the component parts.

When two sounds have their rates of vibration properly proportioned—when one of these, for instance, has a rate of vibration double that of the other—we get a tone and its octave. If we have three tones, representing the musical notes C, G and E, for instance, we have a pleasant resulting combination or harmony, the rates of vibration being relatively 8, 6, 5.

But if we produce a combination which is not made up of consonant rates, then we get an unpleasant result, which we call discord; and when two tones bear certain other proportions to each other—when they are a trifle removed from each other in their vibratory rates—a result known as beats is heard Nearly every one has noticed, when a large bell is being tolled, that between the blows of the hammer there is heard in the dying tones a sort of waving or booming tone, uniform in its rise and fall, yet distinguishable to the last fading sound. In an organ the same peculiarity is sometimes heard, and especially is this true of consecutive octaves of the same note, if one is the least trifle out of tune. These are called beats, and are occasioned by the trifling difference in the tone vibrations, one of which for an instant is parallel with the other and then overtakes it. When we strike a string which is tightly fixed at its extremities, it vibrates, forming an ellipse which is visible. Now, suppose we could make this string subject to two rates of vibration, one of which was twice as rapid as the other, the nodes or crossing points of the ellipses, provided the slowest of these formed an ellipse the entire length of the string, the double vibration would interfere less with the movements of the first than if it vibrated within a mere trifle of the same number of times per second. A rope suspended from the ceiling will illustrate this. If we put this in motion by whirling the loose end, like turning a skipping-rope, its track through the air will assume an elliptical form. Doubling the speed, this will become a double ellipse, and doubling it again we shall have four ellipses; but if we break the rate of speed into irregular fractional movements, the figure will be destroyed at once.

One of the most simple electrical instruments for illustrating these beats is a modification of Professor Carhart's magnetophone, which I shall endeavor to describe shortly.

The rate of speed of a rapidly-moving machine may often be quite nearly approximated by listening to the tone produced by its movements. During the Philadelphia Exposition a member of the staff of the French journal *La Lumiere*, whose specialty was dynamos, among other means of investigation, carried a pocket telephone to aid him in counting the revolutions of these machines. By holding this to his ear, the magnet directed toward the moving dynamo, he was enabled to perfectly hear the vibrations, and the pitch of the tone told their rate, and by practice he had become abundantly capable of determining the rates of the different machines, which were occasionally quite at variance with information derived from other sources.

Carhart's magnetophone is the invention of Professor H. S. Carhart, of the N. W. University at Evanston, Ill. The instrument consists of a thin disc of sheet iron, or other conducting material, with one or more series of holes, about one-fourth of an inch in diameter, punched parallel to the outer circumference of the plate. Opposite these openings the pole of a permanent magnet is placed in close proximity, but not touching the disc. Directly opposite this magnet, and near the other face of the plate, a small electro-magnet is fixed, the wires from which are joined through a hand telephone. Now, when the disc is revolved, the field of the magnet is cut by the solid portions of the metallic disc, but is left free to act when the open portions of the disc pass between the faces of the permanent and the electro magnet. The action is quite similar to the interruptions of the current of air or steam in the siren, previously described. For every interruption there is a change in the induced action produced in the electro-magnet; and these changes, influencing the diaphragm of the telephone, produce a tone, the pitch of this being in direct proportion to the speed of and the number of openings in the disc.

With two rows of holes at different distances from the center of the plate similarly arranged, having two electro magnets, instead of one, in circuit with the telephone, two fundamental tones, instead of one, are heard, and, if the number of holes in one row is just double that in the other, two distinct tones will be heard in the telephone, one of which will be an octave above the other; and if there be several of these circular rows of openings in the disc, the several electro-magnets all being in circuit with the telephone, the number of interruptions being properly arranged as to proportion; a perfect musical chord of tones will be the result.

Professor Carhart has recently made a modification of this instrument. by which it becomes a counter of vibrations.

In this case the disc has one row of holes, and one electro-magnet is used, near the disc; but a second electro-magnet coil, mounted on a permanent magnet, like a telephone devoid of diaphragm, is placed in the circuit with the telephone and the coil at the disc.

Opposite, and in close proximity to the coil attached to the permanent magnet just described, a tuning-fork is placed, and this when vibrated, sets up currents in the circuit of its coil, and, of course, in the telephone. Now, with this current in motion, if the disc be revolved, it is readily seen there will be two notes heard in the telephone, and a conflict of sounds produced, if the two rates of vibration do not bear a proper musical relation to each other. If the two rates are exactly equal, we shall have one tone; but if they differ by a few vibrations to the second, we shall get well-defined and perfect "beats."

If with a regular source of motion, which can be accelerated or retarded at will, we combine a counting mechanism on the axis of the disc, and adjust the speed until the two sounds are in perfect unison, the vibrations of the tuning-fork, which are unchangeable at a given temperature, will be recorded by the counter.

Another interesting experiment suggests itself right here—the effect of temperature on the vibrations of the tuning-fork. With a given temperature, its rate of vibration, having been counted by the means mentioned, is recorded. Increasing or decreasing it, we shall throw the two rates into discordant proportions, which we can again bring into unison by readjusting the speed of the disc; and thus a scale of vibratory rates may be made, which will give the results of temperature influence on vibrating metals.

—— Mr. Reuben J. Robinson, electrician of the Riverside Mills, of Providence, R. I., has been added to Mr. H. M. Cleveland's committee on wire, to report at the next electric-light convention. Mr. Robinson is a valuable man in this work.

Beating Time Badly.

A writer to the New York *Tribune* relates the following: "On a certain Tuesday morning a telegram was received per night message by the New York house from a San Francisco correspondent, asking the price of an article sold by the New York firm. The New York house cabled at 10 A. M. to London for the price, and the same was received in London about 3 P. M. the same day—five hours later than New York. The London house wired to Worcestershire for the price from a manufacturer, and received the same per wire at 5 P. M. the same day, Tuesday. London then cabled the price to New York at 5P. M., and the dispatch was received at New York about 12 noon the same day, Tuesday, or five hours earlier than London. New York then wired to the San Francisco correspondent (five hours earlier than New York), who received it when he came down to business on the morning of the same day, Tuesday. San Francisco wired to New York, accepting the price, which dispatch was received in New York at 3 P. M. the same day, Tuesday—five hours later than San Francisco. Now note the results:

	Miles.
San Francisco to New York (inquiry)	3,000
New York to London (for price)	3,000
London to New York (giving price)	3,000
New York to San Francisco (giving price)	3,000
San Francisco to New York (accepting price)	3,000
In all	15,000

Not counting the dispatches which passed between London and Worcestershire. And yet at the hour of 3 P. M. Tuesday, when New York received the dispatch from San Francisco accepting terms, London was wiring Worcestershire for the said terms. New York stood between the ten hours between San Francisco and London, and hence the surprising results."

Telegraphers in Distress.

The experience of the ten telegraph operators who went out to Siam a few months ago has been anything but profitable or agreeable. At the same time there is a ludicrous side to their misadventures.

In the first place, the men were to receive the big salaries guaranteed them only on condition that they signed a contract to remain five years and were accompanied by their wives. The Siamese Government would have no unmarried employes in the service, and it was a difficult matter to find ten men willing to take their better halves to Bangkok, knowing as they did the peculiar domestic economies of that country and its monarch. It was not until the Siamese Consul at New York had sworn by Buddha that the King had no designs upon the ladies that the lightning calculators agreed to go.

Their passage out was paid, and after a tedious voyage they arrived at Bangkok full of hope that in the short period of five years they would be able to return to the United States with their pockets comfortably full of money. A letter recently received from one of the party does not, however, reveal much prospect of a realization of that hope. On the contrary, they have become disheartened and disgusted. They find Bangkok a dirty, sickly place, with very few white inhabitants, and their princely salaries have dwindled down to $120 a month, while the cost of living for that length of time is considerably more. Other operators in Siam receive $195 a month, and our ten unfortunate pilgrims are looked down upon as an importation of American cheap labor.

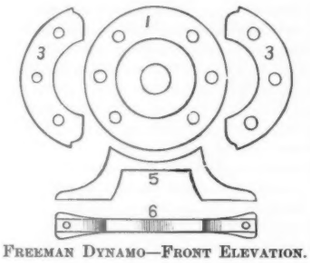
But that is by no means the worst of it. The Government is not good pay. Most of the operators have from three to five months' salary due them, and the ten new ones have also to learn a system of telegraphy with which they were unfamiliar. Neither does there seem to be any great rush of business; but notwithstanding the small amount of work to be done and the fact that they cannot get paid for even that, they are still true to the traditions of the craft and propose to strike for bigger wages.

The operator from whose letter these points are taken further mentions that the water in Bangkok is not fit to drink, but he does not complain on that account. This is another characteristic of the true American telegrapher.

The letter concludes with the remark that "we go to bed hoping to find ourselves in America on waking up," and that "as soon as we can get money enough to get there we shall certainly get."

The Warren P. Freeman Electric-Light System.

Mr. Warren P. Freeman, of this city, has invented a complete electric-lighting system, which we illustrate this week. His incandescent lamp we described to our readers in our last issue. The dynamo manufactured at the factory, 106 and 108 Liberty street, is shown herewith. The solid parts of the machine are few and simple, and so constituted that every piece can be finished in a lathe, thereby bringing the manufacture of the machine within the constructive ability of any ordinary mechanic. No special tools are necessary in constructing the machine. The cores of the field magnets are set in annular plates surrounding the armature concentrically, and with all their axes in planes parallel with the axis of the armature, and hence every

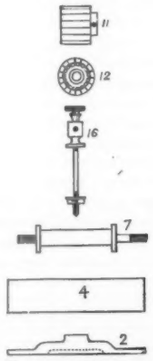


FREEMAN DYNAMO—FRONT ELEVATION.

part of each field magnet is equally magnetized, thereby influencing the armature uniformly, and utilizing all the magnetism produced. By the "Freeman" machine the whole field from B^1 to A^1 and from A^2 to B^2 is uniformly and evenly charged, and a very superior result, it is stated, is produced. The field magnets in this machine are made in the form of spools, which can readily be wound in a lathe, and they are set into the annular plates which form the end framework of the machine in two groups, one on each side of the armature, each group subdivided centrally into two sections, which are separated by a central segmental keeper plate. The annular plates in which the field magnets are set, and by which they are retained in place, also act as keeper plates. The field magnets on each side of the machine are equidistant from each other, and the whole length of each magnet is equidistant from the axis of the armature, around the periphery of which they are arranged.

With this construction all of the electro-magnetism generated in the machine is utilized and also is very evenly distributed on all sides of the armature and in every part of each of the field magnets.

The machines are built in sizes suitable for 15, 30, 50, 100, 250, 500 and 1,000 incandescent lights, and each machine is guaranteed to do the work it is designed for. They are



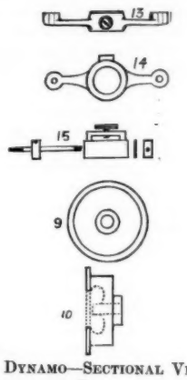
FREEMAN DYNAMO—SECTIONAL VIEWS.

also built to produce current for from 5 to 100 arc lamps.

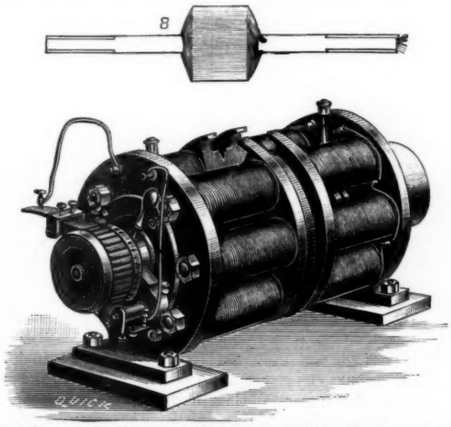
The detail drawings of the "Freeman" machine, show the simplicity of the mechanical details.

In the drawings, No. 1 represents an end or front elevation of one of the annular end or keeper plates, between which the field magnets are secured. No. 2 is an edge elevation of the same piece. Sketch No. 3 represents elevational views of the sides of the segmental field magnets interposed between the inner ends of the core-spool. No. 4 is an elevation of the edge of one of the said field magnets. Nos. 5 and 6 are respectively a front elevation and a plan of a footpiece or cradle in which the machine rests One of these pieces is used at each end of the machine—*i. e.*, one under each of the annular end plates, No. 1. No. 7 is an elevation of one of the core-spools of the field magnets. Both ends of this spool core are turned down to a sub-diametered size and screw threaded. The shorter end is screwed into the segmental field magnet No. 3, and the longer end is passed through the end or annular keeper plate No. 1, and is held in place there by a nut screwed on the screw threads on that end of the spool piece. No. 8 is a side elevation of the rotary armature and the shaft on which it is mounted. Nos. 9 and 10 are respectively a front and side elevation of the driving pulley which is fitted on the outer end of the armature shaft, and by which it is rotated. Nos. 11 and 12 are respectively side and front elevational views of the commutator which fits on the adjacent end of the commutator shaft, and which is connected with the armature wires projecting from the end of that shaft. Nos. 13 and 14 are respectively a plan and front elevational view of the quadrant forming a part of the brush-hold for the commutator. No. 15 is a side elevation of the brush-holder proper. No. 16 is an elevational view of the binding post.

It is essential that the magnetism of the field magnets should be evenly produced and evenly distributed over the external surface



FREEMAN DYNAMO—SECTIONAL VIEWS OF PULLEY AND BRUSH HOLDER.



FIGS. 1 AND 2.—WARREN P. FREEMAN DYNAMO AND SIDE ELEVATION OF ARMATURE.

of the armature exposed thereto, and in this machine the said uniform distribution of magnetism on the field magnets, Mr. Freeman states, is certainly and accurately produced and maintained, and any liability of the machine to change its polarity is obviated. The "Freeman" machine will, no doubt, have a large and increasing sale.

When at the Philadelphia Electrical Exhibition, it will be remembered by all who enjoyed a visit there, that the results attained by Messrs. Freeman's No. 2 machine, were very satisfactory, and improvements have been made since.

One valuable feature, illustrated by Fig. 3, is that the usual field magnets, A^1 and A^2, B^1 and B^2, are overcharged, whereas in this dynamo from A^1 to B^1, from A^2 to B^2, is equally and uniformly magnetized, therefore, Mr. Freeman states, there is no so-called "surface induction" carried over from A^1 to A^2, or from B^1 to B^2.

—— There are now about three thousand electric lights in the city of Philadelphia, public and private, the larger portion of them being owned by four companies—the Brush, the United States, Thomson-Houston and the Excelsior—whose conduits are all underground. The first electric light in Philadelphia was put up in December, 1881, by the Brush Company, and since that time they have steadily increased in number. In large stores or manufactories, where it is necessary to have brilliant lights, electricity is much cheaper than gas.

Arkansas News.

LITTLE ROCK, ARK., Sept. 25, 1885.

Editors of the Electrical Review:

Electrical matters are quite lively in Little Rock at present. The Little Rock Electric Light Company, using the Brush arc system and Swan Incandescent lamp, with the Brush multiple cut-out, are doing a fairly profitable business, and increasing steadily, both systems giving general satisfaction. The Van Depoele plant, owned by the Little Rock Junction Bridge Company, and using at present eight lamps, is doing finely.

The Brush-Swan incandescent plant in the *Gazette* Building, owned by the *Gazette* Publishing Company, has been running seventy 20 candle-power lamps for five months, giving excellent service. The Little Rock Oil and Compress Company are putting in Brush-Swan systems of 150 lamps, 20 candle-power, in each of their two mills. The Baltimore and Ohio Telegraph Co. are busy running lines between here and Pine Bluff, sixty miles down the river, the Western Union having failed to stop them with the injunction applied for. The Southern Telephone Company have just finished running their wires, and are now connecting instruments. This is a new company in opposition to the Bell Telephone. They have over three hundred subscribers for the new "'phone." The instrument used is the Long patent. An electrical works will be started in a very few days by two practical electricians. The Little Rock Electric Light Company will soon light the streets from their station Hyde's new Opera House will be lighted by electricity as soon as finished. The Swan lamp will be used. M.

—— The splendid work done in wiring the Third avenue Theater, this city, is by those skillful electricians, Stout-Meadowcroft Company. Very few of the numerous admirers of this fine electric-light installation appreciate the difficulties to be encountered in placing the wires to reach all the multitudinous lamps, so tastefully arranged in this theater, and these gentlemen are to be congratulated on the excellence of their work. All the lamps, of the Edison system, were also furnished by the Stout-Meadowcroft Company.

—— 528 O'Beirne Mast Arms are to be erected in New Orleans, La., Dec. 15, 1885, for the Louisiana Electric Light & Power Company.

—— An exchange says: "Clean and oil leather belts without taking them off their pulleys. If taken off they will shrink. Then a piece must be put into them and removed again after the belt has run a few days."

—— The Schuyler Electric Light Company has contracted with the Watertown Engine Company, of this State, for two of their engines, of 150 horse-power each, to be placed in the plant at Richmond, Va. On account of the muddy water, the Baragwanath heater is used.

—— Chester Electric Light and Power Company, of Chester, Pa., has organized with a capital stock of $50,000. The directors are G. P. Denis, Amos Gartside, D. P. Paiste, Robt. E. Ross, John M. Broomall, Jr., Jos. Messick, James Deering, D. G. Hendricks, C. W. Perkins and Samuel J. Cochran, of Chester, and Richard Peters, of Thurlow.

—— Dufferin Terrace, at Quebec, is to be illuminated the whole of next week with the electric light generated with the motive power of the Montmorency Falls. Experts have been delegated from various points to attend and watch the result, which possesses special interest for the electricians and electric-light companies, inasmuch as it will settle the scientific as well as the economic question whether the cheaper motive power supplied by waterfalls can be used successfully and made profitably available for the electric lighting of cities, towns and villages situated beyond a certain limited distance from the generating point. It is not deemed feasible, in certain professional circles, to light Quebec with the water power of the Montmorency Cataract on account of the immense leakage over the great distance the current will have to travel, for though the falls are only seven miles from the City, the distance by the wires, as they had to be placed to secure perfect insulation and to complete the current, is thirty-four miles.

—— The meeting of the Supervisors' Committee on Street Lights at San Francisco recently engaged in a discussion on electric lights, wires and poles. The Pacific Thomson-Houston Electric Light and Power Company had made an application for a franchise to erect and maintain poles, wires and conductors to supply electric lights throughout the city, and this petition came up for consideration. F. E. Shattuck, who appeared on behalf of the company, stated that it was the intention to erect poles on Market street for a mile out, and along Kearny and Montgomery streets. George H. Roe, of the California Electric Light Company, appeared to oppose the franchise on the ground that there were already too many wires on Market street, and, if any more were put up, all would soon be put under the ground. He did not see why additional franchises should be granted, as the companies could use the poles already up. F. M. Speed and F. W. Bowen, of the Pacific Electric Motor Company, said that their company had not been able to make any satisfactory arrangement to run their wires on the poles of other companies, but would co-operate with the Thomson-Houston Company if the franchise were granted. The committee took the matter under advisement.

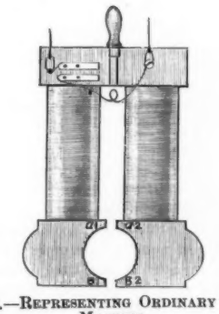


FIG. 3.—REPRESENTING ORDINARY FIELD MAGNET.

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We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

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NEW YORK, OCTOBER 10, 1885.

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In the list of September 29th, forty-three patents, all bearing the same date, were issued to one inventor, H. C. Spalding, of Boston. The largest number heretofore issued to a single inventor at one time is said to be twenty-six, which were granted to a resident of Indiana. Edison and Weston have each obtained twenty-five in one week, but now the record has been broken by a New Englander, who scores nearly double that number, and has ten or fifteen more cases pending.

The New York *Graphic*, of September 24th, contains an interesting account of the Tehuantepec ship railway, fully illustrated. The plans of this railway are the result of the studies of that very capable gentleman, Mr. James B. Eads, 34 Nassau Street, this city, whose practical experience has particularly fitted him for this great undertaking. The method of raising and lowering the great ships, the construction of the cradle, and the steamer in transit, pulled by three locomotives, are graphically described and illustrated.

Dr. W. W. Jacques, who has been connected with the electrical department of the American Bell Telephone Co. for five years past, has tendered his resignation, to take effect this month. Dr. Jacques is an accomplished electrician, and will, no doubt, devote himself to some other branch of the electrical field.

The Post-office authorities of England were not disappointed in their expectation of a rush of telegraph business on the granting of the sixpenny telegrams, which went into effect October 1st. The returns show a largely increased business. The majority of the messages sent were kept down to the sixpenny rate, the public condensing them to the limit of twelve words.

The American Electric Manufacturing Company have taken possession of the new Fuller-Wood factory on West 18th street, and are putting it into working order as rapidly as possible, for turning out Wood's new improved dynamo. It is said that the new fifty-light machine is more efficient in its work and economical in amount of power required to operate it, than any arc-light dynamo yet introduced to the public.

We publish an announcement on the tenth page of this edition by the Bridgeport Brass Company, Benedict & Burnham Manufacturing Company, and the Electrical Supply Company, which will be of interest to the electrical field, particularly the users of insulated wires. These companies state that purchasers of their wire will receive absolute protection against any liability under the Cowles patent, which is the apparent bone of contention among the manufacturers of insulated conductors.

The Baltimore & Ohio Telegraph Company, in honoring such capable gentlemen as Charles Selden, Ed. A. Leslie, and J. E. Zeublin, all of whom are now general superintendents, gives evidence of that farsightedness which has not only made the company the strongest competitor the Western Union has yet encountered, but which has popularized it with the general public. These gentlemen are young, energetic and deserving, and the B. & O. has shown a very proper spirit in thus appreciating their work and talents.

A trial of the Daft motor was made last week on the Ninth avenue elevated road, several well-known railway magnates being passengers. There was a hitch at one time, caused by a part burning out, that caused the motor to be hooted at by the observers on the street below, and this gave Mr. Jay Gould an opportunity to suggest that some electricity be dropped down on them. The passengers are not at all pronounced in calling the trial a success, yet as the motor carried them up the road and back again safely, they have cause for congratulation.

The Phelps Induction Telegraph Company, with commendable enterprise, have completed arrangements with the Western Union Telegraph Company whereby messages may be sent and received from trains on the Harlem River Branch of the N. Y., N. H. & H. R. R., to and from any part of the United States, and will furnish a telegraphic service with the same promptness and certainty as from other regular offices of the Western Union Company. The regular Western Union city rate will be charged, with an additional ten cents for each dispatch for train service, and operators will be placed on all the important trains. This gives the Phelps system a commercial value at once, and patrons of that road will now have an opportunity to fully test and appreciate its advantages.

The *Petit Marseillais* says that the underground telegraph line from Paris to Lyons and Marseilles is completed, and the wires will be used as soon as the instruments destined for them are placed in the offices at Paris, Lyons, and Marseilles. This underground line, added to those overhead, will not only allow messages to be accelerated, but will enable communications to be kept up no matter what the state of the weather may be. Underground lines will also be laid between Marseilles, Toulon, and Nice. Marseilles and Havre are already connected by a direct wire, and this not only secures rapid communication between the two ports, but places Marseilles in direct connection with the United States, as the Marseilles-Havre wire is to all intents and purposes the prolongation of the Franco-American cable, which abuts at Havre.

A curious telegram was published on Saturday last from Chicago, stating that the Gold and Stock Telegraph Company would hereafter furnish quotations at $2 a week, or a reduction of $4. This cut is made to compete with the Commercial Quotation Company, which offers its "tickers" at $10 a month. When the latter company heard of the reduction, it immediately reduced its rates to $5 a month. But a telegram was published on Monday stating that the managers of the Commercial Company in New York immediately wired to their Chicago representative an order to cease putting in their "tickers" at all. It would be interesting to know whether the Commercial Company intends to retire from the field altogether, or merely to allow the Gold and Stock to furnish the quotations for the present at what the Commercial Company considers to be ruinous figures, which cannot be maintained.

The communication from the South Carolina "Kicker," in this issue, demands more of an answer than we have space at present to give. The prevailing idea among telephone subscribers that the percentage of profits to the companies is enormous, is undoubtedly erroneous; and the facts as stated in "Kicker's" article are undoubtedly true, that the rentals and royalties on the patents now held by the American Bell Telephone Company, the cost of reconstruction of the lines, the necessary repairs to keep them in good working order, and the current operating expenses for salaries of managers, operators, linemen and inspectors, (nearly all of which are shamefully small) reaches an amount in many exchanges which is not equaled by the subscription receipts. The average profit of the several exchanges of any one company, under existing relations to patents, franchises and imperative expenditure, will allow of only a small percentage for dividends. These seem to be the rock-bottom facts. That an enterprise so important to the mercantile interests of our country, should be so handicapped, is unfortunate, but that it is, has been fully demonstrated.

Mr E. N. Dickerson, the eminent patent attorney, discourses at some length in another column on the recent suit brought by Attorney-General Garland against the American Bell Telephone Company. Mr. Dickerson is a gentleman learned in the law, and while the fact that he has been for years attorney for the American Bell would very naturally prevent him from intentionally doing that company an injustice, still what he says is generally found to contain the first principles of law, and the case he makes out on this occasion is certainly a strong one. The fact that Attorney-General Garland is a stockholder in the companies to be benefited by the suit against the American Bell, is a juicy slice for his political opponents, and Mr. Garland is, consequently, in very warm water at the present moment. Surely, the telephone is assuming a position of national importance, and the amount of space now given to it in the daily press is only equaled by the inaccuracy of many of the statements made. Still, we may be permitted to remark, the American Bell Company seem to be getting the business, and, also, winning the suits as fast as a trial is reached with a universality that really must be getting monotonous—to their opponents, at least. The article from the pen of Mr. Dickerson is very entertaining, and coming from one of the most capable patent attorneys in this country will attract much attention.

DANGERS ATTENDING THE EMPLOYMENT OF IRON PIPES AND IRON BOXES FOR UNDERGROUND CONDUITS.

Inquiries have come to us several times recently concerning the use of iron pipes and iron underground conduits for carrying electrical conductors. This is a subject of such importance, owing to the attending dangers, that we feel it demands more than a passing notice. We are unable to learn of any iron pipes and boxes used at present as conduits for underground wires which give satisfactory service, although they have been laid at various times quite extensively. It is our desire to deal fairly with all interests involved, and at the same time treat the subject in a scientific spirit. Owing to the prominence which this question has attained, we deem it timely to advise a careful study of the entire field before adopting any particular system, thus to determine not only which is electrically most perfect, but also which is free from dangers. We unhesitatingly give it as our opinion that a system making use of a material so permeable as cast iron to the action of foul air and illuminating gases, with which it is well known the earth of large cities is saturated, is most dangerous and its employment unwarranted. This opinion is based upon past experience with conduits of this material, and we recall quite a list of casualties resulting from their use, comprising not only damage to property with resulting heavy bills of expense, but also injuries endangering life. In nearly every instance where these conduits with manholes have been put down their use has been discontinued after a short experience. An underground conduit company, of Philadelphia, which employs iron conduits, has had its full share of unpleasant and dangerous experiences, and we understand that, although this conduit has been down for two years in that city, the only use it is being put to at present is to carry a few wires of an electric-light plant, which the conduit company owns and controls.

The Philadelphia correspondent of the *Electrician and Electrical Engineer* in their September edition, says:

"The plant of the American Sectional Underground Conduit Co., which was laid along several blocks of Chestnut street, has come to grief at last. If you recollect, in a former number of the *Electrician and Electrical Engineer* I spoke of the explosion of foul air and gas in the manholes of these conduits. They have become such a nuisance to people in general that workmen are now engaged in digging up the sections and carting them away. This is probably the best disposition to make of them."

And again in the same journal we find it reported by their Chicago representative that the Chicago Sectional Underground Company, who formerly used the iron conduit system introduced by the American Sectional Company, have discarded it, and he also states that the "iron pipes used by the Bankers and Merchants' have been unfortunate in this regard on two or three occasions, and the Western Union came near losing two valuable men by a similar catastrophe. Mr. Summers, electrician, and Mr. Brotherhood, engineer, were both badly injured by an explosion of burning gas. The presence of gases in these pipes is destructive to all forms of gutta-percha, Chatterton's compound, etc., used in joining wires, and the only remedy seems to be, in some form, to keep these gases out of the pipes, for the two-fold purpose of protecting joints and preventing either suffocation or dangerous explosion, when man-holes are opened for repairs or inspection."

Then again, the action of the alkali on the iron pipes has been known to eat holes through them within a very short period, as in the case of the Brooks system in New Jersey.

In view of the fact that very strong claims have been made by conduit companies operating in Philadelphia, Chicago and Detroit, it would seem to us very proper that the New York Electrical Subway Commission should visit those cities, and satisfy themselves as to the relative merits of the systems in use.

GENERAL WESTERN NEWS.

The brothers Renard—Charles and Paul—on the 22d September, made a balloon ascension from near Paris, France, with some late improvements in aerial apparatus which, it is claimed, have made a great stride in this species of navigation. The party consisted of the brothers and M. Poilevin, who left Meudon, a suburb of Paris, at 4.25 P. M., arriving at Point-du-Jour at 5.12, returning to Meudon at 5.35 P. M. The distance between the two points is between four and five miles. On the outward trip the balloon moved against the wind, but returning sailed with it; the difference in time—47 minutes as against 23 minutes—showing the result of the opposition offered by the elements. On the following day the experiment was repeated, resulting as satisfactory as before. The direction of the wind in the latter case was reversed to the former, and was something less forcible than in the first instance, when its velocity was about nine miles per hour. Various manœuvers were executed, and it seemed to a looker-on to be readily and easily managed.

The screw propeller made fifty-five revolutions per minute, its diameter being about 23 feet. The balloon was filled with 1,860 cubic inches of pure hydrogen. The moter constructed by Gramme is rated at eight French horse-power, and is actuated by current from a secondary battery of Charles Renard's designing, which weighs a trifle over 700 pounds.

The Baltimore and Ohio Telegraph Co. is rapidly removing its overhead wires. Cables were last week removed from Washington street, and other portions of the south and west sides are being cleared. From Chicago avenue to the tunnel on the north side, and east to State street, they are being removed, and the poles are also disappearing. Prof. Barrett, superintendent of city telegraphs, says he is now in a position to punch up the various companies, as his wires are all underground from the river to Van Buren street, and the rest are "hunting their holes" on both the north and west sides. He says the business part of the city will be free of visible wires and cables by Christmas.

The Secretary of State, on the 26th ultimo, issued a license of incorporation to the Chicago and Cook County Pan-Electric Telephone Company of Chicago, capital stock $500,000, to carry on telephonic business in this county. The incorporators are Dr. Kossuth Morgan, Albert Hagan and James B. McClure.

In a conversation a few days ago, a gentleman who is desirous of seeing "all monopolies smashed," to use his own phrase, was quite loudly denouncing the Bell Company, because "Bell stole the telephone from Gray, while Reis, Edison and others invented it previously, and it was a fraud of the grossest kind to allow such a wonderful and useful instrument to be so controlled to the detriment of the general interests of the community," etc., etc. When the question was put, "suppose you were Bell and Bell were you, how would you answer such statements?" He seemed to receive new light on the subject, and suddenly perceived that it makes a good deal of difference whose bull it was that gored the ox.

If that gentleman could have had the experience parties here passed through while endeavoring to establish the first exchange in Chicago—and this was only one experience of many, of all, indeed, of the original workers—when it was almost necessary to use a club to force the people into seeing the value of such an installation—when it took several months of constant hammering and coaxing and arguing to obtain *eleven* subscribers, at barely nominal rates, with which to open an exchange in Chicago—when the monopoly for the entire State of Illinois could have been bought for the pitiful sum of five hundred dollars, and any man who would have thought of taking it would have been written down an ass—perhaps the gentleman, had he passed through that sort of crucial test of the dear public's appreciation of telephonic communication, would possibly have known exactly what the state of the art was at that time, and could have made some tolerably fair guesses at what it was when Reis dropped it.

It would seem to be appropriate in all this matter for somebody to consider how the telephone was made so valuable, and by whose money and toil it was converted from the mute German invention which was only capable of giving us "songs without words," to the present vocal performer which as readily repeats vocal as musical tones, the original of which was a crying nuisance on railroad and telegraph wires all over the land, the rage for which was so purely epidemic that general orders were issued everywhere driving the abomination off the lines. If, in the future, we are to have only Reis telephones, heaven help the managers of the insane asylums. Even the present improvement occasionally nearly drives one crazy.

From Germany comes a description of an electric brake for passenger and freight cars on railroads. The brake-shoe is the core of a peculiar-shaped electro-magnet, formed to the curve of the wheel. A spring holds this away from contact under ordinary circumstances. The current is furnished by a dynamo on the locomotive, run independently, the switch being in easy reach of the engineer. To circumvent accidents the brake circuits are arranged in multiple arc, so that any mishap which may disable one of these will not affect the remainder. This form of brake would be easily arranged for use on electric railways, and peculiarly adapted to that form of transportation.

Yet, while this at first sight appears to be quite perfect in its arrangement and reliable in its action, one or two points present themselves as being possibly objectionable. In the first place the close adherence of the metal brake-shoe which is necessary to obtain the desired end, induces an immense friction and consequently development of great heat. In the ordinary wooden brake this often results in the burning of the shoe; such heat would necessarily destroy the insulation of the coil; and again the constant jarring vibration would probably crystallize the wire connection, rendering these brittle and eventually break them. Still these objections may be overcome, and the electric brake will by and by fight its way into permanent commercial existence and value.

From London, September 28th, a telegram announces that the Messrs. Opperman, manufacturers of electric-light apparatus at London and Chicago, have gone into bankruptcy.

Mr. Opperman, manager of the Chicago branch, at No. 80 Market street, when asked for information on the subject, said that he knew nothing personally of the failure, and was taken entirely by surprise; that while he knew that six months ago the London house had $10 assets for every dollar of liability, he knew nothing now of their indebtedness. The Chicago house, he said, was entirely solvent, paid spot cash for everything, and asked no odds of any one.

Mr. Opperman has been quite extensively engaged in the manufacture of the Opperman incandescent lamp to fill contracts, but has also installed a limited number of their arc plants. He purposes continuing the business as heretofore, without reference to the London house, and when seen by your correspondent was rushing things to complete a large order which was to be finished by the terms of the contract by the last day of September. He said that up to date, at a rough estimate, he had been fearfully bored by newspaper reporters on the subject, and when pressed hard by one of these to know truly and confidentially what the results to the Chicago house would be, answered "Nothing, except to flood my place of business with Paul Pry reporters, anxious, for the sake of a sensation, to ruin a legitimate business enterprise."

There is a story going the rounds of the Insurance papers of a party who has had three barns burned by lightning, on the same site, and some of his friends have advised that he select a new spot on which to build the fourth barn. The reason assigned is that "there is probably something in the character of the soil at that particular place, perhaps an excess of moisture, which has a particular attraction for the fluid." The editor of the *Cincinnati Price-Current* seems to have a more philosophical head, thinking it more probable that badly managed or imperfectly constructed lightning-rods were the cause. He says: "Some thirty-five years ago we purchased a dwelling-house that had been struck several times by lightning, and always more or less damaged thereby, but never burned. It had lightning-rods at each of its three chimneys. We took them down. The house is still occupied as a residence, and lightning has never touched it since the rods were removed."

Yes, and by far the greater number of so-called "protected" houses, with all sorts of twisted and new-fangled cables and plated rods, insulated from the building by glass and porcelain drawer knobs, unsoldered joints with small or no ground-plates, and these, where they do exist, laid flat instead of perpendicularly, and thus in connection with several instead of one stratum of soil—all such, saving the presence and asking the pardon of the average rod fiend, who blocks and jaws with all the skill he possesses, the better routes of electrical travel are far less endangered when such rods are removed and with them the temptation which these offer to the elements. Such buildings are far, far safer without than with such protection; and it may be added truthfully, that at least ninety-nine per cent. of all the rods in the country are of this dangerous character. Somebody has imagined an encounter between the spirit of the original lightning rod man and one of these latter-day fellows:

"Ah, Benjamin! could you but rise from your grave
And meet unawares some sharp lightning-rod man,
An alternate current of fear and disgust
Would make ev'ry bone beat a loud rat-a-plan.

While the marrowless frame, from your head to your heel,
Kept hot angry time to a jig or a reel,
And the lightning would flash from each orbitless eye,
As flashes the fire from a storm-angered sky!"

Another incandescent system has arrived, this time that of Beaman Taylor King, owned by the Consolidated Electric Company, of London, England, represented here by Mr. Charles B. Brodie.

This is one of the central-station plans, in which both arc and incandescent lamps are fed from storage batteries, these latter being placed at sub-stations, at varying intervals throughout the district covered by the plant, and charged by dynamos at the central station, by which process the expense of wiring is materially reduced, and the system is decentralized by being cut up into sections, so to speak. The company has various plants in operation in England, notably one at Colchester, Essex, and another at Lisbon, Portugal. These two plants have been in constant operation for over two years, and the peculiar form of storage battery, covered by the company's patents, both at home and in other countries, is claimed to be very superior to any other known form, and some twenty-six months of this service have failed to polarize a single plate.

Mr. Brodie is here for business and purposes opening up trade at once, as soon as his preliminary arrangements are completed.

Mr. J. F. Wollensak has recently purchased the works of the Gill & Segerdahl Electric Company, and will hereafter do something in the electrical line, in addition to the manufacture of locks, bell-hanging supplies, etc.

Colonel S. G. Lynch, 144 La Salle Street, furnishes the following quotations of Telephone stocks at the close of the 2d inst.:

Chicago	$375 @	$400
Central Union	50 @	53
Michigan	68 @	70
Iowa Union	20 @	23
Great Southern	28 @	33
United	14 @	15
M. & K.	55 @	57
R. M. Bell	45 @	50

CHICAGO, Oct. 6, 1885.

A NEW TELEPHONE TIME REPEATER.

Mr. John M. Oram, general manager of the National Time Regulating Company, of Boston, Mass., has been granted a patent for a new telephone time repeater. The particular feature of this repeater is the fact that it is impossible for it to get out of adjustment, the signaling devices being geared securely to the repeater train so that its movements necessarily control all the signals. The movements of a well-constructed clock train, as is well known, are absolutely sure, and in considering this in connection with the arrangement of the gearing in Mr. Oram's invention, the reliability of it becomes at once unquestioned. To provide against any accident caused by breakage, or other unusual cause, an automatic device is provided so that if the repeater should ever go out of unison with the controlling standard regulator it will ring an alarm notifying the party having it in charge, and at the same time stop the signals, making it impossible to transmit erroneous ones.

This repeater will be handled by the National Time Regulating Company, of Boston, and as its value and reliability become more fully known will undoubtedly be in large demand. Its simplicity, both in construction and operation, is a feature worthy of particular mention, and its inventor has certainly secured a decided success in bringing it out at the present day. A single repeater placed under the control of a standard regulator and connected with the telephone exchange by a single circuit, furnishes accurate time to each subscriber, who, to receive the time, has only to listen for a moment at his telephone. The telephone then becomes not only of value as a means of talking and transacting business, but gives to every subscriber the same results that would be attained by the possession of a $500 regulator.

Judge Parrett, of the Vanderburg and Posey Circuit Court at Evansville, Ind., on Saturday last gave a decision in the telephone litigation now pending in Evansville. The judge, in his decision, announced that he was satisfied as to the constitutionality of the law passed by the last Indiana Legislature limiting telephone charges to $3 per month. He added that the word "telephone" in the law included all the various appliances in the telephone business necessary to its successful operation, and that the defendant, though a foreign corporation, was subject to the laws of the State. In reply to defendant's pleas that the royalty paid the Bell Company would not admit of doing business at $3 per month, the judge said if such was the case, they should quit business. This is the first of a long list of similar cases against the company in that State, and the presumption now prevailing is that the telephone business will be discontinued there very soon, as it cannot be conducted at any such rates.

Mr. Hughes, a boiler maker, who lives at 735 Ninth avenue, New York, and who has spent much time in thinking how hard it is to get up and light the fire on cold mornings, exhibited yesterday the contrivance by which he does away with the hardship. The invention, which is patented, is a tin clock which can be set like an ordinary alarm clock. If you want your fire started at 6, you set the clock for that hour, and put it on a little stool before the stove grate At 6 a spring moves, bringing down with a rush a short metal rod projecting from the back of the clock. A match is fastened to the rod so that it will rub against a piece of sandpaper and go off. A strip of paper fastened to the clock connects with the kindling in the grate, lights the fire, and there you are with a warm room to get up in A second contrivance in the clock can ring and alarm and wake you up as soon as the fire has had time to warm up the room. The clock was made to work repeatedly yesterday, and never failed. Mr. Hughes said he used it on his stove all last winter. Can't some electrician give this problem of lighting fires in the morning some attention, and, if successful in its solution, become at once famous, rich and popular?

Telephonic News

⁂ Slowly, but surely, the rentals of the instruments of the New England Telephone Company are being raised, and the subscribers are still subscribing with a few exceptions.

⁂ On the occasion of the return to his old home in Boston by Mr. H. E. Irvine, late joint manager and treasurer of the Royal Electric Company, of Montreal, an impromptu dinner was tendered him by the staff of the Company on Saturday, Sept. 26.

⁂ V. F. Butler, of Havana, Cuba, general manager of the telephone company there, has been in New York for a few weeks, renewing acquaintances and looking after business affairs. Telephone matters are gradually improving again in his territory, after a severe depression that cost the company several subscribers.

⁂ The Central Union Telephone Company have declared a quarterly dividend of $1.50 per share, from net earnings, payable October 24, to stockholders at record at the close of business October 17, 1885. The transfer books will be closed at three o'clock P. M., October 17, and reopened on the 26th of the same month.

⁂ The stockholders of the Pan Electric Telephone Company directed Bradley T. Johnston, of Baltimore, attorney, to proceed to Memphis to represent the interests of the company in the test case with the Bell Telephone Company, involving the question of priority of invention, which is set for trial Monday, October 12.

⁂ The output of the Bell Telephone Company for the month ended September 20 was as follows:

	1885.	1884.	Dec.
Gross	2 386	2,542	156
Returned	2,217	1,168	*1,049
Net output	169	1,374	1,205

*Increase.

⁂ The hearing of the motion for preliminary injunction asked by the American Bell Telephone Company against the Pan-Electric Company, at Baltimore, has been adjourned to November 2, 1885. Meanwhile an order is issued restraining the defendants until the said hearing, also restraining them from taking new subscribers, or using any instruments except those now in use.

⁂ All hope of the safety of Mr. F. A. Gower, the aeronaut, who has been missing since July last, has now been abandoned, says a London paper. Mr. Gower has made four or five balloon trips across the channel, the last being in July, when he crossed from Hythe to Cherbourg in Gen. Brine's balloon, "The Colonel." Subsequently, on the 18th of the month, Mr. Gower made an ascent from Cherbourg, and he has not been seen since, but the balloon, without the car attached, was found about thirty miles from the place from which he set out. Mr. Gower had amassed a considerable sum by scientific invention, the most important of which was the telephone, of which he and Mr. Bell were the joint patentees in England.

⁂ The New England Telephone directors have postponed the consideration of the dividend question till the monthly meeting of Oct. 28, but it is understood that no dividend can be paid this year, and only a small one hereafter unless the Bell Telephone Company makes further concessions in royalties, or raise dividends upon its stock. There will be $7,812,600 of dividend-drawing capital in New England Telephone after Jan. 1, 1886. The net earnings above construction for the last six months reported amounted to $92,000, or at the rate of $184,000 per annum. Deducting $40,000 for annual taxes, there remains but $144,000 for annual division among stockholders, which amounts to less than two per cent. per annum upon this dividend drawing capital, and the dividend drawing capital increases by $600,000 every January 1, until all the stock issued participates in dividends.

⁂ The curbstone conduit is now being considered by the Brooklyn Commissioners. It has gates which can be opened under the sidewalk and street, which are connected by manholes like those of sewers.

⁂ The subscribers to the different telephone exchanges in Belgium continue to increase in number. At the end of July, 1885, there were 774 subscribers in Brussels, 971 in Antwerp, 198 in Charleroi, 374 in Ghent, and 356 in Verviers.

⁂ In the suit filed against the Cumberland Telephone Company for charging over the legal rate of $3 per month, Judge Dyer, has returned a decision holding the answer of the company good, not because of facts, but because it contained an argumentative denial. The plaintiffs immediately replied and insisted upon a trial, the time for which has not been set. Meanwhile, suits by subscribers against the compeny are being piled up. One day last week one firm filed suit for $400 damages for the company's refusal to give them service.

⁂ The Bell Telephone officers do not seem in the least concerned over the suit which has been brought in the name of the United States in the United States Court at Memphis to cancel the Bell Telephone patent on the ground of fraud. The attorneys of the company say that every issue raised in this suit is old, and has been previously decided in Bell's favor. President Forbes, of the American Bell Telephone Co., says that he is not concerned in the least about this suit as a telephone matter, but that he exceedingly regrets, as a "mugwump," that such a scandal should come so near President Cleveland's cabinet. For the Bell Telephone Company, he says, it is only the added expense of another lawyer to go down to Memphis and fight the case. The company had thought that the era of its large legal expenses was drawing to a close.

⁂ The People's Telephone Company, owners of the Drawbaugh patents, have determined to apply to Judge Wallace of the United States Circuit Court next week for a new trial, on the ground of newly-discovered evidence. Their counsel are Senator Edmunds of Vermont and Lysander Hill The new evidence has been introduced since Judge Wallace enjoined the Drawbaugh telephones in the Overland case at Philadelphia, where the Drawbaugh priority was set up as one of the defences. Prof. Barker, of Philadelphia, testified that he had set up exact reproductions of Drawbaugh's telephones, and they operated with great success under various conditions, regarding which Judge Wallace had expressed doubt. An ex-member of Congress, son-in-law of Hon. Simon Cameron, his wife and a number of other witnesses testified that they had seen and heard Drawbaugh's telephones, or had heard them described, previous to 1874. If the motion for a new trial is denied, the case will be appealed to the United States Supreme Court.

⁂ The *Evening Post* says that the exposition made by the *Sun* of the antecedents of Mr. J. W. Rogers, whose extraordinary letter in defence of Attorney-General Garland and the Pan-Electric Company we referred to and commented upon yesterday, presents him to the public in the light of a crank, with a poetical bias and an amazing self-conceit. He styles himself the "last of the Confederate bards." The extracts from his rhymes which the *Sun* collates show him to be no mean rival of our Commissioner of Public Works. He has composed and published a tragedy in five acts, entitled "Madame Surratt," and a long threnody called "Arlington." His collected poems are prefaced by a turgid dedication to "Augustus H. Garland, America's Greatest Lawyer." This dedication is, perhaps, Mr. Rogers' contribution to the political advancement of Mr. Garland, upon which he lays stress in his letter to the *Tribune*. Upon the *Sun's* showing of Mr. Rogers' mental balance we think that his letter on the Pan-Electric lawsuit may as well be cast out of the reckoning, leaving the case as it stood before that remarkable contribution to telephonic literature appeared in print.

Putting the Wires Under Ground.

On Wednesday last work was begun in Detroit to put all telegraph, telephone and electric-light wires under ground, Dorsett's conduit system being used. Six miles of these conduits are to be laid this Fall in the heart of the city where the wires are the thickest. Each conduit has seven separate ducts or channels through which the wires are run in cables. Access is gained to the conduit through manholes stationed 400 feet apart. A separate conduit is laid for electric-light wires, although it is claimed that this is not actually needful. Next season the work will be extended until the poles and wires disappear from the surface altogether.

The Telephone "Kicker" Heard From.

Editors of the Electrical Review:

I am a subscriber to a telephone company, and am interested in its success. I have also been one of the great throng who have howled for a reduction of the rates. The statements in your paper, showing the business of the companies you have reported, do not show a very large margin of profit, as I understand them—much smaller than the usual percentage of profit to a mercantile business—and I also learn that many exchanges (I believe you call them) have been closed and abandoned because they were being run at a loss. Now, I would quietly like to ask this question: Have I, in common with hundreds of others, been making a fool of myself in thus crying "Down with the price," or are these companies being run under a justifiable expense which will not permit a reduction? I can't believe that all the telephone managers are either knaves or fools, and yet the returns of all the companies reporting their business through your columns show a result which would the rather tend to demand an increase rather than a decrease in the yearly rental.

If it is proper for me to stop my noise on this question of reduction, as I am informed by telephone men I should, please give me the facts, and I will change my cry from "War to the hilt" to "Let us have peace," and others would join me if facts and figures warrant. KICKER.

South Carolina, Sept. 26, 1885.

The Telephone Girls.

The young man of the Kansas City *Journal* thus discourses of the telephone girls of his city:

"Engine-House No. 2 has recently been decorated with pictures of the young ladies of the telephone exchange, whom the residents of this city hear from very often, but see very seldom.

"The girl on the left may be recognized by her lisp. A lisp does not sound well in the 'phone. Her name is Mary.

"The next girl, with the book in her hand, may be recognized by her answer to a call, which any one can recognize, for it sounds like the whistle on the steamer Dacotah. Her name is Jane.

"The next girl, who is sitting down by the window, may be recognized by a sore throat, which is probably caused by sitting by the window. The throat cannot be seen but its effects are heard. Her name is Lula.

"The next girl, who if standing, may be recognized by the affectionate manner in which she always answers the 'phone; she always says, 'Yes, dear.' It will be seen that this reply is allowable to woman, child or man. Her name is Kate.

"The next girl in the row may be recognized because, whenever any one calls her up, she always says, 'Busy now.' It is a well-known fact that she never connects wires except in moments of self-forgetfulness. Her name is Lizzie.

"The next girl in the row always thinks that the subscriber is inquiring after her health, and replies "Well," in a manner which gives her the prevarication. Her name is Hannah.

"The next girl may also be recognized by her talk, which is curiously devoid of all nasal sounds. She is supposed to breathe through her mouth, and the substitution of 'd' for 'm' and 'n' gives her conversation a quality which should only be due to change of weather. Her name is Charlotte.

"The next girl in the row may be recognized by the way in which she cuts you off when you are half through with a conversation. She desires the subscriber to wonder how people ever got along before telephones were invented. Her name is Julia.

"The next girl in the row may be recognized by her extreme politeness. She always says: 'Please wait. I am very sorry, indeed, but I really don't think that the party you called will answer; if you will call up again in a little while, I will try once more. Now, don't forget to call up.' Her name is Clara.

"The next girl in the row may be recognized by the fact that no one ever seems to answer her calls at all, and she announces the fact by saying, 'Won't answer,' in a way which makes one feel sorry that she did herself.

"The last girl in the row is the boss girl. She is said to have such absolute authority over the rest of the girls that if she orders one of them to throw herself from the fifth story window obedience and death, or death by decapitation, is the instant result She can be recognized only by the young men who are in the windows opposite her's, and they are too much in awe of her to give away her name."

The Reis Telephones.

It is a well-received principle in patent law that an invention is protected for all possible uses, even for such as were unforeseen by the inventor. In some of the voluminous testimony and arguments of the Bell telephone suits, it has been suggested that the transmission of articulate speech was not contemplated in the original Bell telephone patent. Yet under the law such a feature would not invalidate the patent, which would be good for all its uses.

Philipp Reis invented, constructed, and experimented with a number of different kinds of instruments during a period extending from 1859 to 1874. He died in 1874. These instruments have been repeatedly tried of late years, and it has been definitely determined that they will transmit articulate speech. It would seem therefore that in them would be found the complete anticipation of Bell's broad claim to the electrical transmission of speech. But the point is made that in Reis' hands his instruments did not effect this. It is argued that they were only designed to transmit sounds in general, such as the tune of an air sung into the receiver, or the notes of a piano or other musical instrument. The analogy between the position of the 1876 Bell patent and the Reis telephones is perfect. In both instruments is latent the capacity for transmitting speech, but by neither Bell nor Reis was this power distinctly claimed.

In view of the really striking analogy, the anticipation seems most complete. Both inventors appear on the field with devices adapted for the same end, but neither with perfect distinctness claims this function as a part of the invention.

The courts, in their sweeping decisions in favor of the Bell patent, dispose very summarily of Reis' inventions. In one decision the judge rather gratuitously says that a century of Reis would not have produced an operative telephone. By all the decisions Bell's claims have become so broadly construed that the actual Reis telephone could not be used without infringing them, if it were so used as to transmit speech. In other words, if one of our readers were to place a Reis transmitter in one house and a Reis receiver in another, and connect them by wire, and were to talk over such a line, he would constitute himself an infringer of Bell's claims, though he was using an invention made by a man who died two years before the date of Bell's 1876 patent. If Reis himself, as is almost certain, spoke through his telephones, he ought to be considered an infringer in advance of his time. Seriously speaking, however, the bearing of the Reis inventions upon the Bell claims depends on the following facts: Reis' telephones did transmit sound; they probably transmitted

speech in the days of the inventor, as they are perfectly capable of doing so at the present time. This much should constitute them an anticipation of the broad claim to electrical transmission of speech. But their effectiveness as anticipations would be vastly increased if it could be definitely proved that speech had been transmitted by them during Reis' lifetime.

Numerous passages from Reis' writings are cited to prove this. But they all are considered unsatisfactory to about such an extent as is the Bell patent of 1876, in its own claims to speech transmission. An appeal to Reis' contemporaries has been made with far more fruitful results. In Professor S. P. Thompson's work on the Reis telephone, a number of letters from friends of Reis are printed. Many of the writers are men in high standing in the scientific world The letters are in some cases to the effect that articulate speech was received through the telephones as early as 1859 1864. Others are not so definite as to the facts.

The fact is that the scope of the Bell patents, as determined by the courts, is a monument to the ability of the lawyers engaged by the Bell Telephone Company. We are firm believers in according protection to inventors. The recent tendency of the courts to destroy patents should certainly be deprecated by all who have the real interest of the country at heart. But, in equal measure, the unjust broadening of claims should be condemned by all. The inventor, Mr. Bell, has reaped ample reward for any merit that did exist in his labors. As his work seems to have been so largely anticipated, and as the public are really suffering from the rigid monopoly awarded his stock company, it is time his claims were more carefully scrutinized and their extent limited. This work we hope will be effectually done by the Supreme Court whenever the case will be properly presented to them.

The general opinion of patent lawyers is that the United States Supreme Court has been too rigid in its dealings with original patents and reissues. Few patents comparatively can stand before it. The Bell patents have not yet reached this last tribunal. It will not be strange if the much criticised action of the court in patent cases shall at last be productive of good, and tend to defining and restricting the extent of a monopoly that has become a public evil. The inventor and his family have all reaped fortunes out of the patent. The corporation itself has founded a business that the entire annihilation of the patents would not destroy. Thus even in the destruction of the Bell patents, no hardship would be done, and the public would be vastly benefited.—*Scientific American.*

An Egyptian Telegraph Diplomatist.

There was one feature of the Berlin Telegraph Conference that was not lacking in the dramatic as well as the sad reality—to one company, at least. That shrewd gentleman, Mr. Pender, was for once outgeneralled At the meeting of Tuesday, Sept. 8, Mr. Floyer, the representative of Egypt, who, up to the present, had not appeared to take much interest in the proceedings, rose and proposed to reduce by half his share of the rates, and extend the line from Egypt to England on conditions which he believed would be accepted, and that the other countries through which the line passed would make a similar reduction. At first there did not seem to be much objection to this proposal, but presently it was observed that if the land-line rates were reduced, the rate of the Eastern Telegraph Company's cable must undergo a similar reduction, and the company must suffer a very serious loss. On this the States interested began to withdraw their adherence to Egypt. During the discussion it was remarked that if Egypt were to declare herself ready to enter the European telegraph regime she could claim as a right from the States interested a much greater reduction than 50 per cent., which they seemed inclined to refuse her. Mr. Floyer rose, and speaking very deliberately, said that in that case Egypt would enter the European regime. There was a moment of profound silence, broken only by an exclamation by one of the Eastern Te'egraph Company's representatives that the simple declaration would entail on it a loss of £70,000 a year. Floyer, after agreeing with the president to prepare a formal declaration for the next meeting, gathered up his papers and withdrew. The circumstances which led to this denouement are as follows: Five years ago, when telegraphy was first introduced, the Egyptian Government entered into various agreements with the Eastern telegraph companies by which it surrendered all its international telegraph rights, and more especially its right to charge transit rates on all messages passing through its locality. Egypt, in fact, sold her birthright for less than pottage. By one concession the company carried even the local traffic between Cairo and Alexandria. This was described in the agreement as a measure to relieve the Government lines, while it was not mentioned that the company encashed receipts of some £40,000 per annum. The company established its own offices in the principal towns—Alexandria, Cairo, and Suez—ran their own lines between these places, and became dangerously independent. The Government lines hardly existed. The company encashed all the transit and terminal rates, estimated at £30,000 a year, for many years. Egypt telegraph matters was a humble department of this powerful company. She had a nominal autonomy, but little or no income. At the international conferences Egypt had no representative, excepting in 1875, when two railway officials went to St. Petersburg and enjoyed their visit. In 1878, the general in charge of the railways and telegraphs found things in the latter department in such a hopeless condition that he invited to his aid an experienced official from India. On Mr. Floyer's arrival, a severe and vigorous reform took place. When the concession for traffic between Cairo and Alexandria expired, the government service in one day took the overwork and income without the engagement of a single additional employe. In five years the revenue was trebled, while the expenses remained about the same, but there still remained a great financial loss annually, and the irksome feeling of dependence. It would seem now that through Mr. Floyer's skillful management Egypt may ask for better terms, and may suggest to the company that it is not to exact its pound of flesh. The situation, therefore, as it now stands, is this: Either the Egyptian Government will recover its long-lost transit rates, or the Egytian merchants will be able to telegraph to England for 7d a word, instead of 1s. 8d. In the latter case the Eastern Telegraph Company loses heavily, but in no case does the Egyptian Government lose anything. Meanwhile Mr. Pender, M. P., who had returned to England in the belief that all important matters demanding his presence here had been disposed of, came back as fast as an express train could carry him, in compliance with telegraphic summons from Sir James Anderson, and it remains to be seen how the agents of the Eastern Telegraph Company will extricate shemselves from the dilemma in which they have been suddenly placed by the representative of Egypt. At a subsequent session of the conference, however, Mr. Floyer's neat diplomatic coup was perfectly successful, and as the London *Times*, in its leader, says, "There was a look of astonishment when the representative of the Eastern Telegraph Company recovered his breath He was still sufficiently under the influence of that emotion to blurt out in its naked simplicity the painful truth that £70,000 of the company's annual receipts depend upon the failure of Egypt to look after her own interest by taking advantage of the general telegraph arrangement of the continent" On the principle, perhaps, of "*qui s'excuse s'accuse*," Mr. Pender writes to the *Times*, detailing at length the various alleged boons and benefits that Egypt and humanity in general have received from the philanthropic hands of Mr. Pender's telegraph company. Mr. Floyer, in reply, says: "To speak of Egypt as indebted for the benefits conferred upon her by the accident of the main lines of communication between Europe and the East running through her locality, seems to me the same as if the railway companies were to hold the inhabitants of Flahone indebted to them for the admirable railway service they enjoy. If any one was benefited by the taking into Suakim of one of the Suez-Aden cables for a busy traffic, it was probably the company. Further, it seems unreasonable to consider a few shillings not exacted from the British soldiers as any equivalent for the thousands of pounds withheld annually from the Egyptian Government, and if the proposal to become European was fraught with difficulties, as alleged, then the company must have given up these thousands for the benefit of the Khedive."

.... Important conferences have been held in Baltimore during the past few days between the officials of the Baltimore and Ohio Railroad Company and the Baltimore and Ohio Telegraph Company looking to a reorganization of the telegraph service of the telegraph department of the railroad company, and an enlargement of the field of operation of the Baltimore and Ohio Telegraph Co., and the following arrangment of the staff and assignment of duties has been agreed upon, taking effect Oct. 1: D. H. Bates, President and General Manager B. & O. Telegraph Company, and General Manager B. & O. Railroad Telegraph Department, headquarters New York city; E. A. Leslie, General Superintendent Eastern division, headquarters New York city; C. W. Price, Superintendent, headquarters New York city; C. J. Sheehen, Superintendent, headquarters, Boston, Mass., S. S. Bogart, superintendent, headquarters Weehawken, N. J.; J. W. Larish, assistant superintendent, Buffalo, N. Y.; C. Selden, general superintendent, central division, headquarters Baltimore; J. B. Stewart, superintendent, headquarters Baltimore; N. C. Griswold, assistant superintendent, Pittsburgh; John E. Zeublin, general superintendent, western division, headquarters Chicago, Illinois; J. D. Clark, superintendent, Chicago, Illinois; B. F. Lloyd, superintendent, Cincinnati, O.; E. Le Lonp, superintendent, Galveston, Texas; George T. Williams, superintendent of the National Telegraph Company, Cleveland, O.; D J. Ludwig, superintendent of Commercial News Bureau, New York city; M. M. Buchanan, auditor, Baltimore, Md.; C. S. Jarvis, auditor eastern division, New York; E. J. Kenney, auditor western division, Chicago; H. Van Hoeoenberg, electrician, New York city; William Maver, Jr., assistant electrician, New York city; W. E. Huntington, superintendent B. & O. district service, embracing three divisions; John A. Helvin, superintendent construction, eastern division; H. V. Riley, superintendent construction, central division; J. P. Bach, superintendent construction, western division. In addition to General Superintendent Selden's duties to the B. & O. Telegraph Co., as above, he will have charge also of the B. & O. railroad telegraph department over all the lines owned and operated by that company from Philadelphia to Parkersburg, Columbus and Chicago. The business of the B. & O. Telegraph Co., has increased during the past few months to an extent beyond the most sanguine expectations of its officials and with the additional equipment which has been ordered, and the enlargement of the system which will be undoubtedly carried out, together with the immense advantages secured by means of its quadruplex system the free right to use which has been recently demonstrated in the United States courts, it is believed that the company has now entered upon an era of permanent prosperity. The officials and staff of the entire service are composed of young, experienced and active men, who have shown themselves quite the equal of their competitors in every test. An exclusive contract for a long term of years has been entered into within a few months between the B. & O. Co., and the United Press, an organization that bears a somewhat similar relation to the New York Associated Press and its allies, to that which the B. & O. Telegraph Co. bears to the Western Union.

TELEGRAPHIC

.... If the present extensive litigation in telegraph and telephone circles continues all winter, many and varied lawyers will be able to keep the wolf from the door the balance of their days.

.... The Western Union Telegraph Company during the convention week sent from its office in Saratoga 393,110 words of report, being the greatest number of words ever sent out of Saratoga in the same number of days.

.... The Western Union Telegraph Company is reported importing a number of low-salaried operators from the Provinces for service in eastern offices. and it is queried if this is a note of preparation for the rate competition with rival lines, announced as soon to place.

.... The face of Ed. Stokes, the President of the United Lines Telegraph Company, now adorns the wood-cut-patronizing press of the country. Mr Stokes is not an unhandsome man, but the majority of the representations as they appear in the country press, are anything but fair to look upon.

.... Apropos of the decline in Western Union, it is claimed, that Western Union's estimate for this quarter a year ago was $204,471 in excess of its actual receipts. The quarterly statement upon which the Western Union dividend has just been declared "estimates" a surplus for the quarter after the dividend of $106,390.

.... Sheriff Dewstoe, of Cleveland, has issued attachments on all the property of the Postal Telegraph Company in twelve counties of Ohio, on a judgment against the Postal Telegraph Company for $42,000 in favor of Campbell C Brown and Thomas Fleming, holders of two promissory notes which were not paid at maturity.

.... The street has been full of rumors that the Western Union Executive Committee would reduce cable rates, and perhaps declare war on Baltimore and Ohio by a sharp reduction in rates to competitive points. The committee met, and Secretary Brewer says they adjourned after transacting routine business. The question of reducing cable or land rates was not broached.

.... The Electric Time & Messenger Company, of Providence, licensees of the Telegraphic Time Company, received a diploma at the State Fair recently, for their exhibit of electric clocks. They also received diploma for their electric advertising clock. The electric time business in Providence is succeeding finely, the demand for clocks exceeding the supply, and the customers all pay promptly, which is good proof of the satisfaction they receive.

.... The Standard Underground Cable Company are putting down three six wire cables in Pittsburgh for the United Lines Telegraph Company. The cable is to extend from the office at Fifth avenue and Wood street to Fifth avenue and Smithfield, along Smithfield, crossing the river on the Monongahela bridge, and along Carson street to foot of incline. There are eighteen miles of conductor in all. The Standard Company is doing considerable work in their line, at the present time.

.... A contract between a telegraph company and a railroad company, by which it is attempted to give an exclusive right to the former to build and operate a telegraph line over the lines and right of way of the telegraph company, and by which the railroad company agrees to discriminate in the carriage and rates of freight against competing telegraph companies, is absolutely null and void as being against public policy, according to the decision of the United States Circuit Court for the Eastern District of Louisiana, in the case of the Baltimore and Ohio Telegraph Company *vs.* Western Union Telegraph Company.

ELECTRICAL AND SCIENTIFIC

* * The Poles are having a hard time of it at present. They are being removed from Silesia by the thousand, and a commission has been appointed to free New York from them. The New York poles have wires attached to them.—*Q. M., O. G.*

* * The meeting of the Buffalo Electrical Society was well attended September 18, and the reports of the officers showed the organization to be in a flourishing condition, both financially and numerically. An election of officers was held with the following results: President, Frank Kitton; Vice-President, Harvey D. Reynolds; Secretary, Astley C. Terry; Treasurer, Chas. H. Carter; Librarian, S. T. Davidson; Executive Committee, Jos. W. Larish, George A. Burnett and William Finn.

* * A little curiosity in engineering has been constructed by an ingenious clockmaker, D. A. Buck. This is, in all probability, the smallest steam engine in the world, for it is almost microscopic in its dimensions. The whole machine weighs only about a gram, or fifteen grains, and is entirely covered by an ordinary thimble. The stroke of the piston is a little over two millimeters, or one-twelfth inch, and its diameter is something less than a millimeter and a half. Nevertheless, it is built up of a hundred and forty distinct pieces, fastened together by fifty-two screws; and three drops of water suffice to fill the boiler and set the toy mechanism in motion.—*Van Nostrand's.*

* * Lieut. Buller Carter, of Bow Lane, London, has invented a new engraving machine, in which electricity has been introduced into the mechanism with great success. It is chiefly intended for decorative engraving upon metal work, and is capable of producing highly finished results with a celerity in which manual work is completely distanced. The words or designs to be engraved are first furnished by a setting of ornamental types or a stereotype plate. Over this is passed, in parallel lines, an arm of the machine, to which is attached a fine protected platinum point. The motion of the arm is responded to by that of a table, which carries the metal to be inscribed or decorated beneath the point of the graver. The types or stereotype plate, by raising the platinum point, put into circuit a current of electricity, which, acting upon an electro-magnet, raises or depresses the graver, and produces an enlarged or reduced engraved copy of the types upon the metal on the table with perfect accuracy.

* * The new special delivery system went into operation October 1. The system provides for the immediate delivery of any letter on which a special stamp of the value of 10c. has been placed, in addition to the regular postage, at the rate of 2c. an ounce. It is necessary that the letter to be delivered shall have the regular postage, in addition to the special stamp, in order to be delivered by this system. In case of non-delivery through no fault of the Post-Office Department, such as non-residence, absence of person addressed, or other such reason, no second attempt will be made to deliver, but the letter will be put in the regular mail to await ordinary delivery. Special delivery letters may be mailed at any post-office in the United States, but can only be delivered at offices in towns containing 4,000 or more inhabitants at the last census. The most expeditious mode of having the letters delivered will be for the sender to deposit them in either the main or branch post-offices, but letters deposited in street boxes will receive all possible dispatch when brought by carrier to the above offices. Special delivery stamps may be purchased at the main or branch post-offices, or at any one of the 100 licensed agencies for the sale of stamps in New York city. Deliveries in New York city are made between the hours of 7 A. M. and 12 P. M. The special delivery carriers are paid 80 per cent. of the face value of the special delivery stamps, or eight cents on each letter, and are allowed no car hire. The Post-Office authorities ask the indulgence of the public for any shortcomings that may be apparent in the beginning, but give assurances that every possible effort will be made by them to insure its success.

E. N. Dickerson on the Jurisdiction of the Courts in Patent Cases.

E. N. Dickerson, attorney of the American Bell Telephone Company, publishes the following concerning the authority for the Attorney-General of the U. S. to institute proceedings to annul letters patent. He states it as his opinion that the Attorney-General has no such authority, and then proceeds as follows:

"In 1836 the Patent Office was created as a tribunal to try the question primarily whether an applicant was the first inventor or not; and if that tribunal found in his favor he was entitled to a patent and could enforce his right to it by a judicial proceeding against the Commissioner of Patents if he was refused. This act repealed the two provisions of the former law above referred to; and from that day to this no authority has ever been given by statute to any one to proceed against a patent for its annulment, except in the case where the Commissioner of Patents has granted two patents for the same invention to different persons, one of which may be annulled by the court at the suit of the opposing patentee. But infringers have constantly been importuning Congress for a law authorizing the Attorney-General, at their solicitation, to institute suits in the name of the United States against patentees to whom the United States had granted patents after a judicial investigation; the object being to array the Department of Justice on the side of the infringers, and to convert the Attorney-General's office into an instrument in their hands for reversing the decisions of the Patent Office. Congress has always refused to introduce chaos into the patent system by authorizing one department of the Government to attack another, in defence of infringers to whom the law has afforded every defence against a patent granted to any one who is not the first inventor. Horace Day made great efforts to obtain such a law that he might have the United States attack Mr. Goodyear, who made the great invention which has rendered his name immortal; and the infringers of the Bell patent have been at work on Congress for a long time in the same direction, but without success. The Committee of the House, however, reported last year that there was no such power residing in the Attorney-General, unless a new act were passed authorizing it, and recommended such a bill, which, of course, died in the Senate.

"In the case of the United States *vs.* Colgate, decided last December by Judge Wallace, the same Judge who maintained the jurisdiction upon the peculiar facts in Gunning's case, was this: The patentee, as Professor Bell has done, had brought suit in the courts, and his patent had been maintained; and, as in the present case, the infringers had induced the Attorney-General to bring his suit to try those questions over again in the name of the United States. Upon that state of facts, Judge Wallace remarks: 'At most the allegations show that there was no novelty in the invention, and inferentially that he, knowing the prior state of the art, which was public knowledge, must have known there was no novelty. All the facts alleged to show want of novelty seem to have been considered in the case of Colgate against the Western Union Telegraph Company, where they were set up in the answer and where the patent was sustained. This branch of the bill, therefore, does not require much consideration,' and he dismissed the bill on demurrer. The decision is not yet reported, but is on file, and of course is known to the Department of Justice which instituted the suit.

"The question whether there is any such right on the part of the Attorney-General has never been before the Supreme Court of the United States. The case of Mowry *vs.* Whitney, referred to by Mr. Goode as an authority, was a private suit by an infringer to repeal the patent under which he had been enjoined, exactly as if the statute of '93 was in force, and he had proceeded within three years of the date of the patent. On demurrer the Supreme Court of the United States dismissed the bill. In the decision of that question, however, the learned Judge writing the opinion made some dicta to the effect that the United States was the only party which could bring such a bill; and upon these dicta the Attorney-General founded his Rumford case when the question necessarily had to be decided. The Judges in that case reviewed the dicta of the Supreme Court in the Whitney case and decided that there was no such jurisdiction. What the Supreme Court of the United States may say about it, it does not become me to prophesy, but as the law stands at present, the courts have decided—in the First Circuit, that there is no such jurisdiction under any circumstances; in the Second Circuit, that where the patentee committed perjury, knowing that he was not the inventor, the Attorney-General may bring a suit, and the courts have jurisdiction; but

FIG. 1.—BRADY MAST-ARM LOWERED AND OPERATING CRANK IN POSITION.

that where the question whether he was the inventor or not has been tried in the courts, the bill of the United States must be dismissed; in the Seventh Circuit, that whatever the United States may do, it cannot lend its name to an infringer who carries on the suit at his expense in the name of the United States.

"This being the state of the law, the Department of Justice has authorized a suit to be brought in the name of the United States against Professor Bell and the Bell Company, in Tennessee, with the stipulation that Casey Young, Colonel Gant and Mr. Broderick, the counsel employed to prosecute the suit, should receive no pay from the Government for their services,' as Mr. Goode informs the public. As a competent Solicitor-General, Mr Goode must have known of the sweeping denunciation by the Supreme Court of the United States of such a performance as this, in a suit for canceling a land patent, where, no doubt, there was jurisdiction, but where the name of the United States was given over to be used in the interest of private claimants. The case is United States *vs.* Throckmorton, 98 U. S., p. 71, in which the court dismissed the bill on demurrer, and said: 'It would be a very dangerous doctrine, one threatening the title to millions of acres of land held by patent from the Government, *if any man who has a grudge or claim against his neighbor*, can, by indemnifying the Government for costs, and *furnishing the needed stimulus to a District-Attorney*, institute a suit in chancery in the United States to declare the patent void. It is essential, therefore, to such a suit that, without regard to form, but in some way which the court can recognize, it should appear that the Attorney-General has brought it himself, or given such order for an institution as will make him officially responsible for it and show his control of the case.' Imagine what the Supreme Court would have said in that case if the person claiming the land of which the suit was intended to deprive the patentee, had been the Attorney-General himself, and not some obscure person who had succeeded in 'furnishing the needed stimulus to a District-Attorney.'

"Mr. Garland, the Attorney-General, and Mr. Goode, the acting Attorney-General in his absence, have published statements of their participation in the suit. The Attorney-General says that his co-directors in the Pan-Electric Company applied to him to authorize the suit, but he declined because he was interested, and then left Washington. Mr. Goode became Attorney-General, and he tells the story, which is thus:

"On the 2d of September he received from the District-Attorney in Tennessee an application to the Department of Justice to bring a suit in Tennessee against Professor Bell, who lives in the city of Washington, and the Bell Company, which exists in Massachusetts, and on the same day Mr. Isham Harris, vice-president of Mr. Garland's telephone company, and Mr. Casey Young, treasurer of that company, waited upon him and urged him to order the suit to be brought. He says they laid the facts before him, and Mr. Young returned next morning for his answer; but he was so satisfied that Mr. Bell was not the inventor of the Bell telephone that he had sent his order off on the morning of the 3d without waiting for that interview. Mr. Goode had never heard of the question before, and his mind was like white paper; but he was eager, as he should be, to protect the honor of the United States wherever it had been assailed. Mr. Garland's vice president and treasurer so shocked him with their narrative of the frauds that had been done upon the Government by one Bell that he set the machinery of justice to work before the next morning. They must have told him that Mr. Bell in the year 1876 had falsely sworn that he was the inventor of the Bell telephone, and in consequence thereof had fraudulently obtained a patent for it—while in fact it had been in public and general use for many years under the name of the "Reis Telephone," which was in every public laboratory, at the Smithsonian, and on sale in the shops of scientific instruments all over the world. That he had aggravated this fraud by inducing Professor Henry, who had one of these Reis telephones at the Smithsonian, Sir William Thomson, and the scientific judges of the Centennial to officially declare that 'this telephone was exhibited in operation at the Centennial Exhibition, and was considered by the judges the greatest marvel hitherto achieved by the telegraph.' That not content with this outrage, he had persuaded the Academy of Sciences in France to recommend to the French Government to confer upon him the Volta prize, which is the only time it has been given in this generation; and, he had actually swindled the French Government out of 50,000 francs, constituting the money value of that prize, in consequence of that fraudulent recommendation. That he had defrauded the Royal Society of England into conferring great honors upon him, as the inventor of this wonderful invention; and by similar means had procured the Court of Chancery of England to pronounce a high eulogium upon him, in a suit maintaining his patent there. That he had succeeded in defrauding the Circuit Courts of the United States for the First, Second and Third circuits into deciding that he was

really the inventor of the Bell telephone, notwithstanding the Reis machine; and that he had fraudulently induced the Patent Office to decide frequently that the Reis telephone was an entirely different invention from his. And that, worst of all, he had actually succeeded in producing an injunction against the licenses of the Attorney-General's own company, in Philadelphia, restraining them from putting out or using the Rogers telephones; and had thereby deprived the Attorney-General's company of a royalty of ten dollars apiece a year on all infringing telephones thus put out, which Mr. J. W. Rogers, now called a crank and repudiated, and J. Harris Rogers, by a covenant, in writing with the Attorney-General's own company, had agreed to pay. And finally, that he was about fraudulently to procure an injunction in Maryland, in the Fourth circuit, after a hearing in court against the Attorney-General's own company, to restrain it from further infringing.

"This tale of fraudulent acts was too much to be endured by Mr. Goode, as the guardian of the honor of the United States; and, as anyone would naturally have done who loved the honor of his country, and had it in charge for a month, he ordered the villain to be promptly pursued. They also must have shown him their bill of complaint, and particularly the following specification:

"'And your orator [the United States] further shows unto your Honors that the said application of the said Bell, as made aforesaid, and so filed in the Patent Office of the United States with the Commissioner of Patents of the United States, in virtue of, and in accordance with the regulations governing said Patent Office, was signed to one Z. F. Wilber, at that time an examiner in said Patent Office, for the examination required by law in such cases, and to determine whether the same contained and set forth in due form any patentable matter invention or discovery. That said Wilber, as your orator now believes, by reason of his want of knowledge of science and the art of applied electricity, and of the state of the art to which said alleged invention or discovery of the said Bell related or appertained, or with which it was most nearly connected, and also by reason of his ignorance of the laws of the United States relating to letters patents for inventions or discoveries, was in all things unfitted to make the said examination, and intelligently determine whether the law had been complied with by said Bell, or whether a patent should be granted and allowed to said Bell by reason of any matter set forth or contained in his said application in the manner and form as the same was therein set forth and prayed for by the said Bell; and, further, that the said Bell knew that the said Examiner, Wilber, was so incompetent and unfitted for the said duty; and the sworn legal opinion by Mr. Wilber, the person thus denounced in the complaint as ignorant and incompetent, annexed to the bill in these words: 'I have since carefully examined the law of patents, and am satisfied that the notice to the attorneys of Bell of February 19, 1876, is not warranted by law, and that their ascertainment of the date of filing Gray's caveat is also contrary to the letter and spirit of section 4,902 of the Revised Statutes. To give such information to applicants for patents had, to an extent, become a custom in the Patent Office; but I now clearly perceive that the law did not contemplate the giving of such information to an applicant for a patent, as it distinctly requires the caveat to be kept secret and the caveator alone to be notified.'

"Any lawyer would at once perceive that the Government had been defrauded by Mr. Bell in accepting a patent from a Patent Office utterly incompetent to understand it; and that when the ignorant official had sworn to the law, since learned by him, it was the duty of the Attorney-General to accept his repentant opinion, and pursue the villain who got the patent.

"Not having waited for Mr. Casey Young to return on the morning of the 3d, and with that burning indignation which this catalogue of frauds had excited in his breast, he did not learn that Professor Bell was living within sight of his department in Washington, and had never been in Tennessee in his life, and that the Bell Company was not a Tennessee corporation, and had never been in that State; but having great confidence in the legal opinion of Mr. Van Benthuysen, who had written to the Department of Justice, as he himself states, requesting 'that such proceedings should be instituted in Memphis before Judge Hammond,' he sent his marshal in pursuit of the villains in Tennessee, who, since that time, has been going about in that State with a writ in the name of the 'President of the United States' in the hope that he can find somebody that looks enough like Mr. Bell and the Bell Company to serve it on. It is supposed that he has been furnished with photographs in order to detect the resemblance.

"Up to my last information, he has not found anybody that looks nearly enough like defendants to make a return to the court; but Mr. Casey Young, one of the directors of the Attorney-General's company, specially employed in this suit, is calling out with a loud voice inviting Mr. Bell and the company to take a journey to Tennessee in order to be served.

"This, so far as I know, is the law and the state of facts in this case.

"EDWARD N. DICKERSON.

"New York, Oct. 3, 1885."

The Brady Electric-Light Mast-Arm.

We illustrate the Brady Electric-Light Mast-Arm, which is owned by Mr. H. M. Linnell, of Hartford, Conn These mast-arms are in use in Hartford, giving the best of satisfaction. By means of them the placing of electric lights in such a position as to prevent the dense shadows cast by intervening foliage is easily accomplished. The advantages of the Brady arm are briefly summarized below, and, besides, it is, we believe, the cheapest arm in the market:

It places the lamp twelve feet from the sidewalk.

It can be lowered and raised in twenty-eight seconds.

It requires scarcely any more time to trim than if placed on the pole itself.

It is not affected by the weather, and requires but one man to raise or lower it.

The operating gear is eight feet from the ground, and is worked by a crank removable at will, thus placing it out of the reach of any but the employe of the company.

It will support a weight of 250 lbs., and will resist immovably any wind less than a cyclone.

It is a fact that electric-light people should appreciate, that the breaking of one lamp, from inferior or weak gearing, costs more than the price of this mast-arm, as compared with other means of suspension.

An Electric Light Problem.—Get Out Your Almanac.

Editors Electrical Review:

Can you inform me how many hours per year an electric light is burned when run from sunset to sunrise, and from sunset to 9 P. M., and from sunset to 12 P. M.?

Yours, T. H. S.

—— 12 Star Iron Towers, each 125 feet high, are to be erected at Peoria, Ill., Oct. 20th, for the Jenney Electric Light Company, Peoria; also 5 Mast Arms for same company

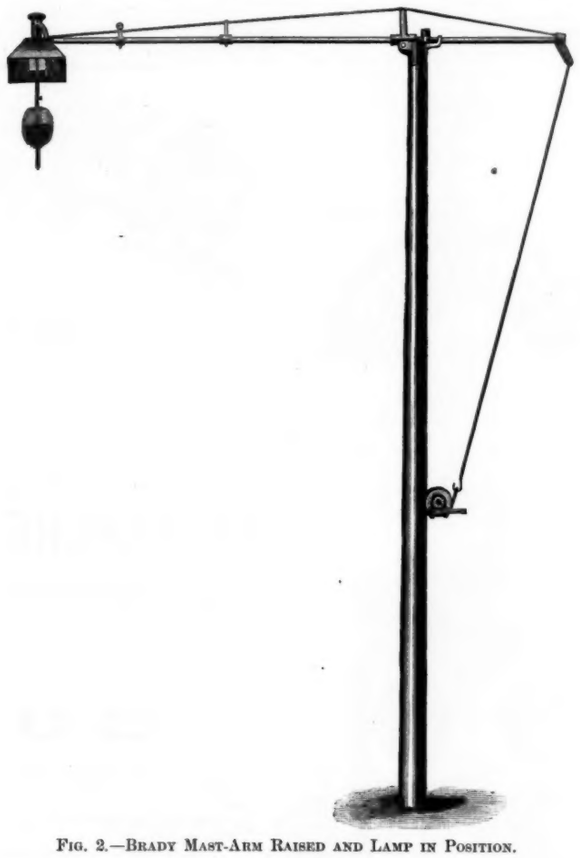

FIG. 2.—BRADY MAST-ARM RAISED AND LAMP IN POSITION.

* * The Egyptian obelisk in New York's Central Park is showing signs of crumbling. At the request of the New York Park Board, Professor Doremus examined the monolith. He says the base is surrounded by little fragments that have fallen from the pillar, and adds: "On applying the finger nail to the surface of the stone, I was able to pick off flakes an inch or more in length. Underneath most of the flakes was a green fungoid growth, which will also aid in the destructive work On the eastern side of the monolith, near its base, is a fissure about three feet in length. It is visible from the roadway. The blade of a knife can be inserted therein between two and three inches from the surface of the stone. A fine crevice continues to a much greater depth. A vein in which this occurs can be traced to the southern and western side of the obelisk. Should this huge piece split off, the monument would fall. I would, therefore, advise that the obelisk be treated, before the cold weather sets in, with melted paraffine, after carefully warming its surface to insure absorption" By vote of the board, the obelisk will be attended to at once.

ELECTRIC LIGHT NEWS

—— The Mansfield Electric Light & Power Company, of Mansfield, O., has been incorporated, with a capital of $25,000.

—— The Steubenville Electric Light & Power Company, of Steubenville, O, has been incorporated with a capital of $50,000.

—— The Middlesex Electric Light Company, of Lowell, has declared a dividend of three per cent. for the six months ending Aug. 31st, besides showing a handsome surplus after paying all construction.

—— The New England Butt Company, of Providence, are manufacturing a new braiding machine especially for covering large electric-light wires. The twine covering is so fed that it runs parallel with the wire, making a covering of unusual strength.

—— The Newton Illuminating Company, of Newton, Kan, has been incorporated, with a capital of $60,000. It will manufacture gas and electricity for lighting and power purposes. Messrs. H. C. Cross, D. W. Davis, Chas. Hood and Wm. Martindale are incorporators.

—— The Middlesex Electric Light Company, of Lowell, Mass, are sinking a well in the cellar of their station at Middle street. The indications are that they will strike water at a short distance down. If the promise is fulfilled there will be a great saving for the company.

—— Electric lighting is becoming a leading feature of theaters and theatricals. The Stout-Meadowcroft Company, of New York, are doing some work for the stage-effect at the Metropolitan Opera House, that will truly surprise the audience when the performance is given next month.

—— The Electric Light Company of West Chester, Pa., put their plant in active operation there last week, lighting the streets and supplying stores and dwellings also. The light is very satisfactory. The gas interests feel the new innovation keenly, and have dropped the price 50 cents per thousand feet.

—— Thursday of last week the Schuyler Electric Light Company was awarded the contract for lighting the Deane Steam Pump Works complete. The works of these celebrated pump manufacturers are so well known that it gives an additional force to the recommendation of the Schuyler system afforded by its adoption.

—— The Providence Electric Light Company (Thomson-Houston) are increasing their plant to a capacity of 470 arc lights. At the present time they are lighting 205 lamps, but have nearly 100 additional orders waiting to be filled. They also have quite a number of the Stanley-Thomson incandescent lamps in use on the arc circuits in that city.

—— Mr. I. N. Baker, superintendent of the Topeka (Kansas) Electric Light Company, reports the electric-light business improving in his city and State. The Brush system is used in Topeka, where there are a number of private users. Mr. Baker has been in New York the past week, noting the improvements in electric lighting to be seen in this city.

—— Mr. A. L. Bogart, of this city, is doing a rushing business with his electric gas-lighter. The demand for these in the churches this fall has been unusually large, and, of course, must all be done at once, and consequently his factory has been one of the busiest places in New York for several weeks past, with prospects of continuing so for a long time to come.

—— The American Electrical Works, Providence, R. I., are very successful in the manufacture of magnets for electric-light and other uses. They are so carefully and skillfully wound that the resistance is exact and uniform. The Telegraphic Time Company use these magnets for their electric clocks, having found them so reliable. There is quite a trade for them also among the electric-light people.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING SEPT. 29, 1885.

326,933 Electric steam governor; Edward H Amet, Chicago, Ill, assignor to Herbert A. Streeter, same place.

326,934 Electric water-wheel governor; Edward H. Amet, Chicago, Ill, assignor to Herbert A. Streeter, same place.

326,979 Lantern for electric lamps; Salomon Heiman, London, England, assignor to Frank L. Pommer, New York, N. Y.

326,989 Printing telegraph receiver; Charles M. Jordan, Minneapolis, Minn.

327,039 Safety device for electrical circuits; Elihu Thomson, Lynn, Mass., assignor to the Thomson-Houston Electric Co, of Connecticut.

327,073 Telephone toll system; Henry Edmunds, London, England, and Charles T. Howard, Providence, R I.

327,080 Junction between cabled and uncabled conductors; Ezra T. Gilliland, Boston, Mass.

327,089 Gas lamp; Leopold Julig, San Francisco, Cal.

327,097 Submarine duplex telegraph; Alexander Muirhead, Norwood, County of Surrey, England.

327,143 Electric headlight; Elisha B. Cutten, Pittsburgh, Pa., assignor to the Electrical and Mechanical Developing Co., same place.

372,324 Thermostat; William H. Schuh, Wayland, Mich.

327,341 Secondary battery; Eli T. Starr and E. Eugene Starr, Philadelphia, Pa., assignor by direct and mesne assignments to the Starr Electric Storage Co., Camden, N. J.

327,375 Electric arc lamp; John G. Allen, Worcester, Mass. Sylvia A. Wood Gould, administratrix of said John G. Allen, deceased.

327,381 Electric railway; Robert L. Cohen, Philadelphia, Pa., assignor of one-third to Samuel G. Diehl, same place.

327,382 Electric railway; Henry T. Clark, Philadelphia, Pa., assignor of one-half to Samuel G. Diehl, same place.

327,383 Underground conduit for electric conductors; George S. Cox, Philadelphia, Pa.

327,391 Electric current meter; John J. Green, Boonton, N. J., assignor of one-half to H. C. Willis and T. F. Hanter, Brooklyn, N. Y.

BUSINESS NOTICE.

More Important Notice

THAN THAT ISSUED BY THE ANSONIA BRASS AND COPPER COMPANY, AND HOLMES, BOOTH & HAYDENS, SEPTEMBER 17, 1885.

To Electric-Light Companies, Telegraph and Telephone Companies, and other parties making or using Insulated conductors:

The owners of the Letters Patent granted to A. A. Cowles, February 26, 1883, for insulated electric conductors, are seeking to disturb the trade by an assertion that parties purchasing insulated electric conductors manufactured by others than the Ansonia Brass and Copper Co., or Holmes, Booth & Haydens, will be subjected to legal penalties.

We beg to assure the trade that we believe, and as advised by competent counsel, that the said Letters Patent of Cowles are utterly valueless. The substance of the claim of invention is an insulated jacket composed of a layer of fibrous material, then a layer of paint in an undried state, and finally another layer of fibrous material. This method of insulating electric conductors is almost as old in the art as the use of wires requiring to be insulated.

Compound coverings for insulating wires, composed of layers of fibrous material, cloth, ribbons, yarns, etc.; superposed coatings of paint, resin, paraffine, red lead, etc.; and an outside covering of ribbon, cloth, yarn, or other fibrous material, with the fibrous constituents of the jacket applied to the paint or other insulating constituent while the latter are in the green or undried state, is more than twenty years old, and is described in a great number of Letters Patent of prior date to the Cowles patent of Feb. 20, 1883.

It is true that suit was brought against the Electrical Supply Co. upon this patent, and the defendants answer was put in a year ago. The answer sets up evidence that both kills the patent and buries any pretended claim to the invention. The plaintiffs have rested quietly during the past year without moving in the case, but now, as the fall trade is opening, a flamboyant circular is issued, but this display will be, we assure the public, the last demonstration that the complainants will make in the case.

We hereby guarantee purchasers and users of our goods absolute protection against any liability under the Cowles patent.

BRIDGEPORT BRASS CO.
BENEDICT & BURNHAM MFG. CO.
ELECTRICAL SUPPLY CO.

September 30, 1885.

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MANUFACTURED BY THE

PARKER-RUSSELL Mining and Manufacturing Com'y,

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100,000 CARBONS PER WEEK.

Using the purest materials and with machinery of our own invention,

Every Carbon is manipulated separately from the beginning of the operation until finished.

They are, therefore,

ABSOLUTELY UNIFORM AND EACH CARBON ALIKE IN ALL ITS PARTS.

In straightness, length of time in burning, brilliancy and steadiness of light they excel all others, and are adapted to the various systems of lighting in use.

EDISON

INCANDESCENT LAMPS

¼ to 20 Candle-Power.

The "B" Battery, Dental and Surgical Lamps, Micro Lamps, Motors, &c.

General ÷ Electrical ÷ Supplies,

Electric-Light Wires, Bare, Insulated and Silk-Covered.

—— Send Stamp for Catalogue.——

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Authorized Agents for the Edison Lamp Co.

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OKONITE

CHARLES A. CHEEVER, President. WILLARD L. CANDEE, Treasurer.

THE OKONITE COMPANY,

Formerly New York Insulated Wire and Vulcanite Co.,

MANUFACTURERS OF

INSULATED WIRES AND CABLES,

No. 13 PARK ROW, NEW YORK.

ELECTRIC BELL OUTFIT FOR

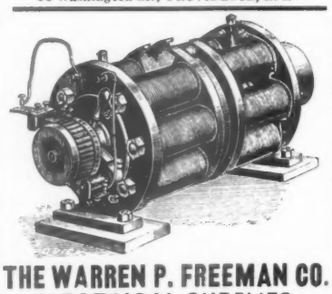
$2.50.

Comprising one walnut box bell, 2½-inch gong, one Leclanche battery, push button, 50 feet covered wire, box of staples.

Sent C. O. D. on receipt of one-third cash.

PROVIDENCE ELECTRICAL SUPPLY CO.,

56 Washington St., PROVIDENCE, R. I.



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Incandescent lamps made to order. 45 to 100-volt Lamps on hand.

50-light Incandescent Machine, including Lamps, $400. 100-light Incandescent Machine, including Lamps, 16 candle-power each, 100 volts, $750. Incandescent Machines up to 1000 lights.

Sole Manufacturers of the Earth Open and Closed-Circuit Battery.

PAINE & LADD,

HALBERT E. PAINE, Late Commissioner of Patents. | STORY B. LADD.

Attorneys in Patent Causes And Solicitors of Patents.

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CABLES { Aerial, Submarine, Subterranean, &c.

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ELECTRIC LIGHT, DISTRICT TELEGRAPH, BURGLAR ALARM SUPPLIES, &c.

Send for Estimates.

Gonda (formerly Prism) Battery, Complete.
See that above label is on every jar

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THE STANDARD OPEN CIRCUIT BATTERY OF THE WORLD.

In order to protect our customers, the public and ourselves against unscrupulous piracy of our title, Prism, and its application to worthless imitations of our Battery, we have changed its name to Gonda, which is fully protected by the following

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Buy none without the above Trade-Mark and the label, as shown in cut. The United States Courts have decided this label to be exclusively ours. No one else can use it.

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The *Genuine* Leclanché Prism and Disque Cells are made *only* by us.

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AMERICAN
Electric Mfg. Company,

EXECUTIVE OFFICES:

Western Union Telegraph Co.'s Building, cor. 23d Street and 5th Avenue,

FACTORY AND WAREROOMS:

163-165 WEST EIGHTEENTH STREET, N. Y.

This Company is engaged in the manufacture of DYNAMO MACHINES and LAMPS, and the construction of ELECTRIC LIGHTING STATIONS for lighting CITIES and TOWNS under the well-known

"AMERICAN SYSTEM"
OF ELECTRIC ARC LIGHTING,

(Wood's Patents.)

SPECIAL ADVANTAGES OF THIS SYSTEM. Completeness, durability, steadiness, quality of light and economy of power. The Wood dynamo-electric generator occupies less space, is lighter, requires less motive power, and costs less than others capable of producing an equal number of lights. There is less firing or flashing of the commutator, and consequently less loss of energy and wearing of the parts from this cause than is the case with other machines. It requires no oiling or other attention than to be kept clean, and its extreme simplicity enables it to be operated with the minimum of skill and attention. The current regulator and signalling apparatus, by which the machine is made to generate the exact current required for any number of lights from one to its full capacity—as they are turned off and on without change of speed or waste of power—is simple, effective, and safe. Its lamps are reliable in operation, the carbon-regulating mechanism being absolute in its control, durable, and unaffected by changes of temperature or weather. They are of ornamental design, and the steadiness and purity of light produced are unequaled at the same expenditure of power.

ESTIMATES FURNISHED For Central lighting stations, or isolated plants, for either the American Arc Lighting System or Edison Incandescent System, or for both combined.

SPECIAL ATTENTION given to installing isolated plants in Mills, Factories, Shops, Railroad Buildings, &c.

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PATENTS. This Company owns and controls all the Patents and Inventions for electric lighting of James J. Wood, J. B. Fuller, and many others heretofore controlled by the Fuller Electrical Co., and the Fuller-Wood Electric Light Co., which include the foundation patents of the Gramme dynamo.

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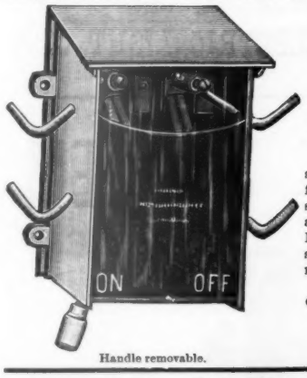

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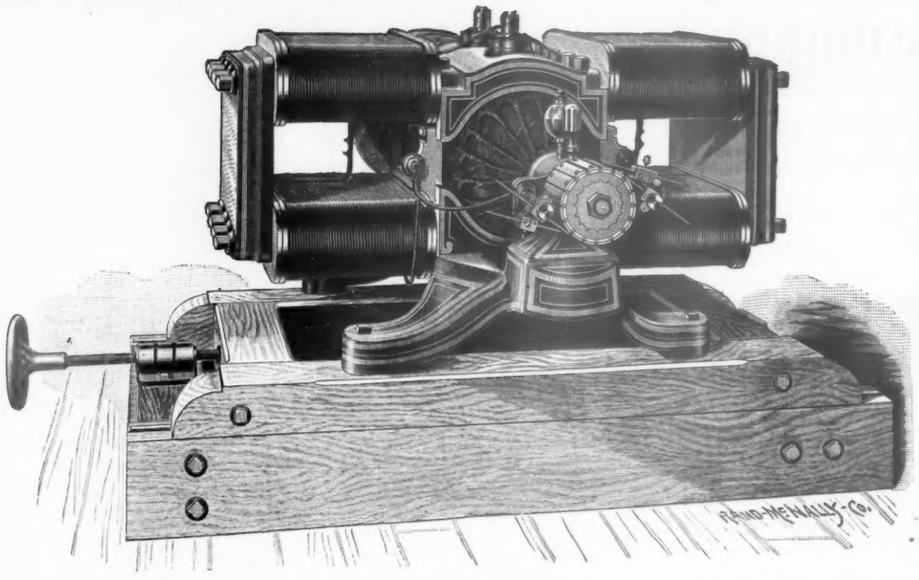

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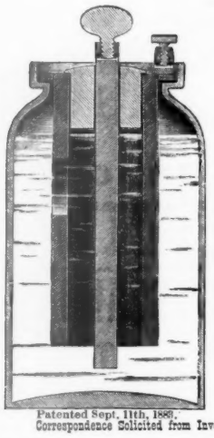

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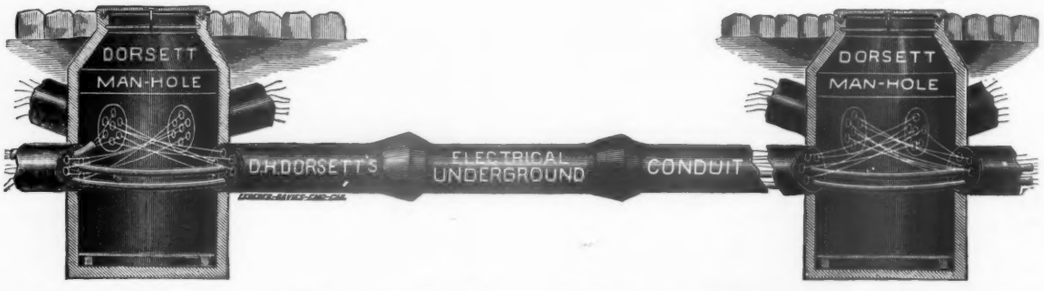

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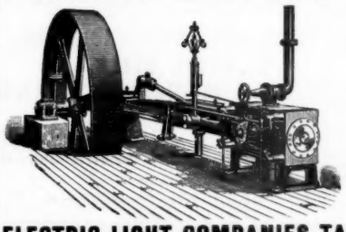

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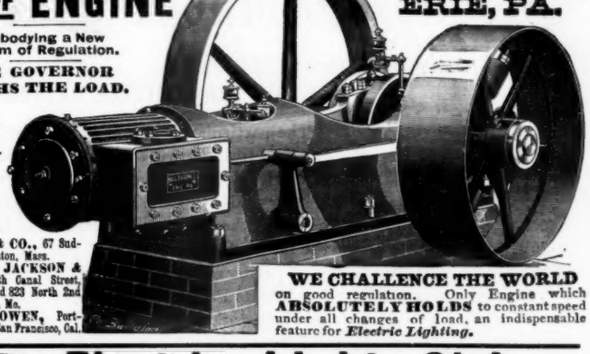

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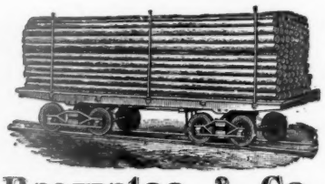

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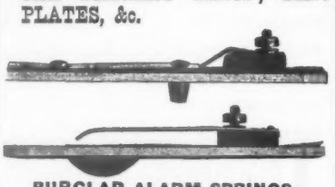

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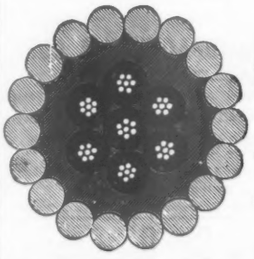

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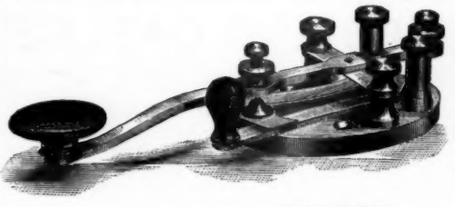

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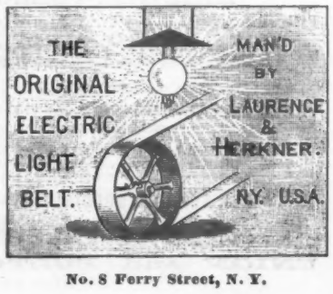

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